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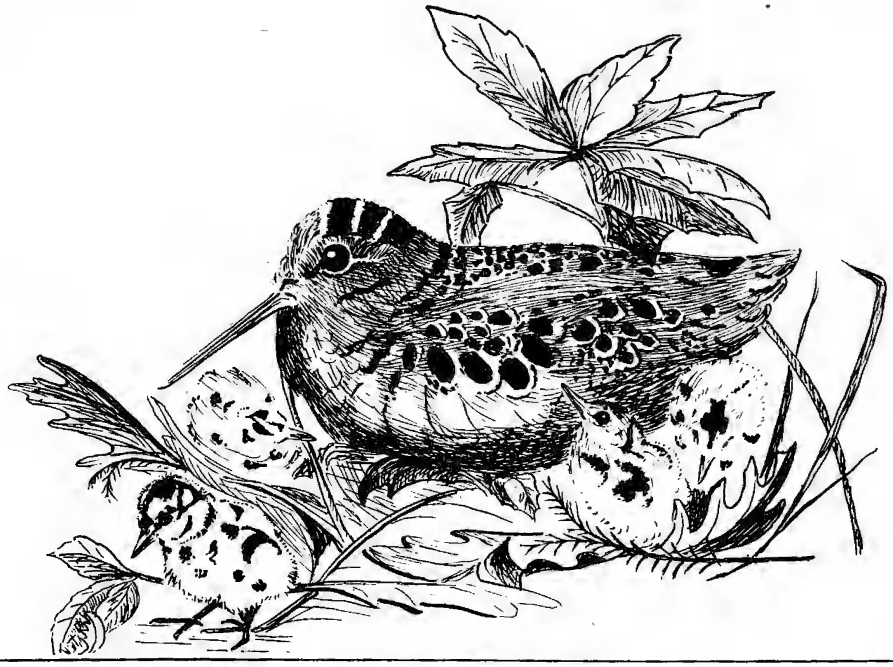
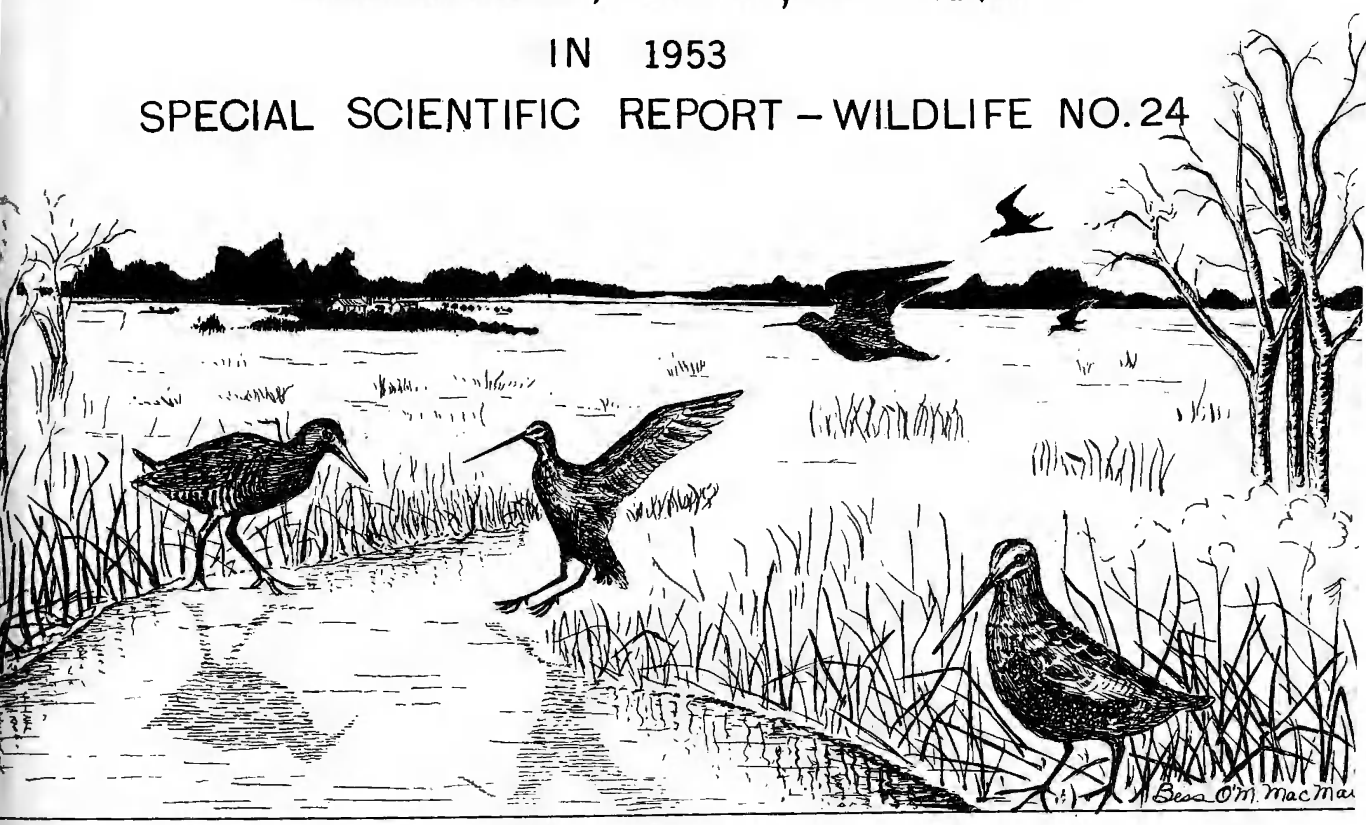


INVESTIGATIONS OF WOODCOCK, SNIPE, AND RAILS IN 1953

SPECIAL SCIENTIFIC REPORT – WILDLIFE NO. 24



United States Department of the Interior . . . . . Douglas McKay, Secretary
Fish and Wildlife Service . . . . . John L. Farley, Director

Canada Department of Northern Affairs and National Resources. . Hon. R. H. Winters, Minister
Canadian Wildlife Service . . . . . W. Winston Mair, Chief

January 1954

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SUMMARY OF 1953 WOODCOCK, SNIPE, AND RAIL INVESTIGATIONS

John W. Aldrich

U. S. Fish and Wildlife Service

One of the most significant steps in research with woodcock, snipe, and rails during the past year was the standardization of method by most of the cooperators working on the woodcock breeding-ground count. Most of the present leaders in woodcock investigations were able to get together at the North American Wildlife Conference in Washington, D. C., during March, and discuss quite thoroughly the methods which had been used in arriving at an index of abundance of breeding woodcock. On the basis of current information on the breeding habits of these birds, details of a standard method of counting were worked out. The thinking of the group was guided by a preliminary statistical evaluation of data previously gathered by woodcock singing-ground counts. Results of this statistical study at Iowa State College will appear in a forthcoming publication by Edward L. Kozicky. Directions for the standardized count finally decided upon and sent to the cooperators were as follows:

Select a route which includes as much good woodcock cover as possible. Establish definite stopping points no closer than four-tenths of a mile apart. Intervals may be increased to any extent necessary to avoid non-woodcock habitats. The length of the route should be no greater than can be covered during the time that woodcock are normally active on their singing grounds, allowing for two minutes listening at each stop. If a route longer than can be covered in one evening is available, however, it may be divided into two or more individual routes.

It would be most desirable for the first stop (zero mileage on the census sheet) to be at a point where a woodcock is likely to be heard so that the starting time for any given evening may be accurately determined. Procedure then would be to wait at first stop until a bird is heard definitely on his singing ground (first flight song). Check the time and wait there for two minutes, counting all different birds heard "peenting" on the ground. Do not count flight songs, except when necessary because of conflicting noises (i. e. frogs) or other factors that render the checking of ground calls impossible, or unreliable.

However, since the first stop may not have a performing bird each evening a certain amount of discretion must be used. The experienced census taker will know approximately what time his birds will start performing on a given evening. Thus suggested procedure in case no bird is singing at the first stop, would be to wait 5 minutes after the latest expected time of song, then drive on to the second stop. Because of this, as well as other unpredictable points, it is almost essential that a census taker receive instruction from someone experienced with woodcock ground calls and flight songs before starting out "on his own." At the end of 2 minutes proceed as rapidly as possible to the next stop and listen there for 2 minutes, again counting all birds heard. Repeat this procedure over the entire route. If timing is correct (except on very short routes) the evening calling period should be practically over after the last 2 minutes of listening is completed. The period during which woodcock perform on their singing grounds varies from about 20 minutes to about 45 minutes in different parts of the country, averaging about 35 minutes. In determining the length of your route you should base it on the minimum time of woodcock calling in your area rather than a longer time. If there is any doubt on this point select the average figure of 35 minutes.

At least 3 census counts, if it is possible to get that many over exactly the same routes and with the same stops, should be made during the breeding season of woodcock, but after migration is over. The approximate census period for your locality will be given you by the coordinator who compiles the over-all data for your region. Exact timing can only be determined by experience in your particular area. Counts should not be made during the period of 3 days before a full moon and two days afterwards (6 days in all), as it has been found the birds are very inconsistent in performing then. They should not be made in heavy rain or snow or when the temperature is below approximately 25° or when a strong wind is blowing (above 15 miles per hour). Each census area should be 2 miles or more in length. It is suggested that existing areas less than that should be discontinued.

Records should include: Date, weather (points indicated on the form including sky conditions and precipitation if any, temperature, wind, moon's phase), length of route, intervals between each stop, birds heard at each stop--combining both sides of the road (record 0 if no birds are heard), time of starting, and time of finishing. All data should be recorded on the forms furnished you. Please describe each area by definite local geographical boundaries, (example: Black Hill Road, running 2.4 miles south from the road leading to Brown's gravel pit). This exact description is needed in case of a change in observers in subsequent years. In case stop No. 1 (the start of the area) does not have a convenient geographical marker it may then be described as being a given number of tenths of a mile from such marker.

The purpose of the type of count described above is to obtain an index of population abundance in the region sampled, not to determine the total population in any area. The principle involved is to make the observations as standardized as possible both as to time and space, so that they will be comparable with the results obtained in different regions and in different years. By and large the cooperators took to this new method very well and secured a good volume of data on the basis suggested. The chief objection was to the suggestion that the records be confined to ground calls or "peents." Summing up the objections to this in the northeast, Mendall, in his report, points out that physical conditions sometimes make it impossible to use only ground calls and that this year's census takers indicated that on 59 percent of their routes all data consisted of ground calls only.

Evidently some of the cooperators thought that the stops had to be 0.4 miles--no more, no less--and felt that in a region of scattered woodcock habitat there would be too many blanks in the observations. Actually, it will be noted, the instructions said "no less than 0.4 miles apart," which gives the observer plenty of latitude in spacing his stops as widely as necessary to miss unproductive habitat.

Another frequently expressed objection was that the stops 0.4 miles apart were too widely spaced to hear all the birds that were calling along the route. It should be emphasized that there is no intent to hear all the woodcock with singing grounds along the route, but to obtain an index of abundance based on those singing at definite points along the route. The 0.4-mile minimum interval was selected to allow a margin of safety against recording the same singing bird twice. The principle of the new method is to obtain an index of abundance in terms of average number of birds recorded per stop. It is presumed to have the advantage of sampling a larger section of country than was possible by the old continuous-count method, thus giving a truer index of the over-all woodcock population.

There were other observations this year which had bearing on various phases of the breeding-ground-count procedure. Blankenship, in his report, says that the full moon did not seem to have any effect on the number of birds active or on the length of the first period of evening activity, and that the distance that birds could be heard calling was such that the distance between stops might be reduced to 0.3 miles without overlap.

Sheldon, in his report, notes evidence that females may peent after their eggs have hatched, which may be responsible for the peak in singing-ground counts which he had recorded at that time during 3 years' observations in Massachusetts, and which Blankenship also mentions in his report of work in Michigan this year. If this

proves to be the case, the optimum time for the census index count would be the period between the migration peak and the hatching peak.

The discovery, reported by Sheldon, of a peculiar midsummer-evening concentration flight of woodcock to a certain burned-over area in Massachusetts was interesting. It was suggested that if a certain type of habitat is required by woodcock for these summer flights the amount of this habitat available might be a limiting factor in woodcock abundance.

This year we had a total of 212 woodcock breeding ground counts as follows: Canada, 38; Central Northern States, 37; Northeastern States, 86; and Central Eastern States, 51. These are summarized by states in table 1. The details for each count appear in the reports for those regions. Because of the lack of uniformity in most areas during the past 2 years, no effort has been made to make an over-all estimate of the change in woodcock abundance.

One of the most interesting situations disclosed by the woodcock count was the extraordinary abundance of birds in one area in central-northern Ohio. The count for this route at the Resthaven Wildlife Sanctuary near Castalia, Ohio, averaged almost six birds per stop. In reply to my letter inquiring about this remarkably high count, Roger H. McElroy, Refuge Manager of the Resthaven Wildlife Sanctuary, gave (in letter) a very interesting explanation: The area is covered with an extensive marl deposit which has been actively strip-mined for the past 50 years. It is a low area, wet except in late summer. Since being made a sanctuary in 1940 there has been no farming, and the vegetation is of the natural prairie type of that region. For many years the area was used as a dumping ground for corncobs, and in many places the cob piles are acres in extent and from 2 to 8 feet deep. These decomposing cobs have produced a habitat that is ideal for earthworms and thus is attractive to woodcock. Mr. McElroy believes that the number of woodcock recorded in his breeding-ground count is in excess of the actual nesting population because of the attractiveness of the feeding ground which may have drawn in birds from a wider area or caused the late migrants to pile up there. Whatever the situation may be, it is of sufficient interest to warrant considerable more investigation. What an ideal situation it would be for a banding operation!

Most of the wintering-ground studies of woodcock have been centered in Louisiana and rightly so, since probably the greatest winter concentrations of these birds are in that state. Leslie L. Glasgow of Louisiana State University continued his ecological and banding studies in the vicinity of Baton Rouge. He gave a paper summarizing this work, which has been progressing since 1949, at the conference of Southeastern Game and Fish Commissioners at Chattanooga, Tenn., in October. Copies of this paper were distributed to those in attendance. Vincent H. Reid and Phil Goodrum of the U. S. Fish and Wildlife Service conducted woodcock counts in west-central Louisiana for the fourth consecutive winter by means of bird dogs. Their findings are reported here.

Table 1.--Woodcock singing ground count data, by States, 1953

State	Routes	Total stops (all trips)	Total birds (all trips)	Average birds per stop per trip
Delaware	2	52	34	.654
Kentucky	2	48	4	.083
Maryland	2	80	33	.413
North Carolina	7	314	87	.277
Pennsylvania	12	320	193	.603
New Jersey	3	64	56	.875
Ohio †	7	168	178	1.060
West Virginia	8	237	156	.658
Michigan	27	665	581	.874
Minnesota	8	121	33	.273
Wisconsin	2	80	58	.725
Maine	45	*	*	.766
New Hampshire	2	*	*	.800
Vermont	9	*	*	1.047
Massachusetts	5	*	*	1.159
Connecticut	16	*	*	.549
New York	9	*	*	.936

† Figures for the route at Castalia, Ohio, were omitted from totals because of abnormal conditions there.

* Information not available for total stops all trips or total birds all trips.

With the opening of a hunting season on Wilson's Snipe this year for the first time since 1940, attention has focused on this species more than in the past. Particularly, emphasis has been placed on developing inventory methods and obtaining information on distribution and abundance so that the effects of the open season on the population might be appraised. In the snipe winter inventory investigations, attempts are being made to get as much data as possible from counts of birds in as many wintering areas as possible, and to group these data in various ways to learn facts about variability and relative abundance of birds by areas. When these facts are determined it may be possible to plan the sampling of the winter populations on a satisfactorily stratified basis so that we may reasonably predict the limits of variability of the annual counts. Chandler S. Robbins of the Fish and Wildlife Service has borne the main responsibility for these investigations as well as for developing trapping techniques for banding. Results of this work appear in reports by Robbins. Most emphasis is being placed on the winter inventory since it is thought that the birds can be more satisfactorily counted at that period when they are concentrated on relatively small areas, whereas in the breeding season they are scattered over a vast area across the northern part of the continent. However, if a sufficient number of banded snipe are recovered it may be possible to determine the relation of certain breeding grounds to certain wintering areas so that certain breeding-ground sampling may be effective. In the snipe breeding ground investigations, considerable progress has been made during the past 2 years in determining the variability of calling time and its correlation with position of sun and with weather conditions. This information will be indispensable if we are ever able to operate a breeding-ground inventory extensive enough in its coverage to represent the bulk of the breeding population. As with the woodcock, we still have to work out methods of determining annual production in advance of the hunting season. From all evidence available, there was little over-all change in the snipe populations between 1952 and 1953.

New investigations which have been initiated this year have to do with working out methods of aging snipe and woodcock for use in hunter-bag checks. Allen J. Duvall of the U. S. Fish and Wildlife Service is heading this line of investigation. If a practical method is worked out it will be possible to appraise the reproduction for that year from the age ratios. Results of investigations along these lines as well as in sex determination were published this year by Frederick Greeley (Jour. Wildl. Mgt. 17: 29-32).

Investigations of any species of rail seem to be few and far between. A study of the sora incidental to waterfowl work by Hal M. Boeker in Colorado is reported briefly in this issue. Robert E. Stewart of the U. S. Fish and Wildlife Service investigated the clapper-rail population and breeding conditions for the fourth year on the special study area for this species at Chincoteague, Va. Little change was found in the nesting population from last year, which was relatively good. A study is being made of variation in clutch size in this species from north to south in the Atlantic coastal marshes, and seasonal variation in the same year is noted. A report on the migration of this species worked out from banding records has been completed and submitted for publication elsewhere.

LOCATIONS OF WOODCOCK INVESTIGATIONS

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WINTERING WOODCOCK POPULATIONS IN WEST-CENTRAL LOUISIANA, 1952-53

Vincent H. Reid and Phil Goodrum

U. S. Fish and Wildlife Service

In conjunction with ecological quail studies in the longleaf pine forest belt of west-central Louisiana, woodcock inventory work was carried on from November 1, 1952 to February 14, 1953. The work was done largely on National Forest lands in Vernon, Natchitoches and Rapides Parishes. See map in 1951-52 report.

Inventory Data

Method.--As in previous years, bird dogs were used in the inventory work. Record was kept of the number of woodcock points made by the dogs and the time spent afield.

Results.--In 223.3 hours afield with bird dogs from November 2, 1952 to February 14, 1953, 172 woodcock points were made. The average number of hours per point was 1.2 (table 2). In 1951-52, the dogs averaged one point per 2.1 hours afield. Therefore, woodcock numbers on the inventoried upland coverts of west-central Louisiana in the winter 1952-53 appeared to be back to the same level as found in 1950-51 and 1949-50 when the dogs averaged one point for about each hour of work. For 1952-53, the over-all inventory figure shows a 50 percent increase over the 1951-52 census data.

Because fall and winter moisture conditions in the piney woods were improved in 1952-53 as compared with 1951-52, there were more favorable woodcock feeding areas. This probably explains, in part, the better count, and the return to the 1950-51 and 1949-50 population levels.

Table 2.--Hours per woodcock point for the winters 1949-50 to 1952-53 in the longleaf-pine area of west-central Louisiana

Winter	Hours afield with bird dogs	Hours per woodcock point
1949-50	129.5	1.1
1950-51	166.5	1.1
1951-52	273	2.1
1952-53	223.3	1.2

Migration

Woodcock began to show up in the coverts of west-central Louisiana around the first week in November. One was sighted in Rapides Parish and two were seen in Vernon Parish on November 5, 1952. The first bird sighted in 1951 was on November 7.

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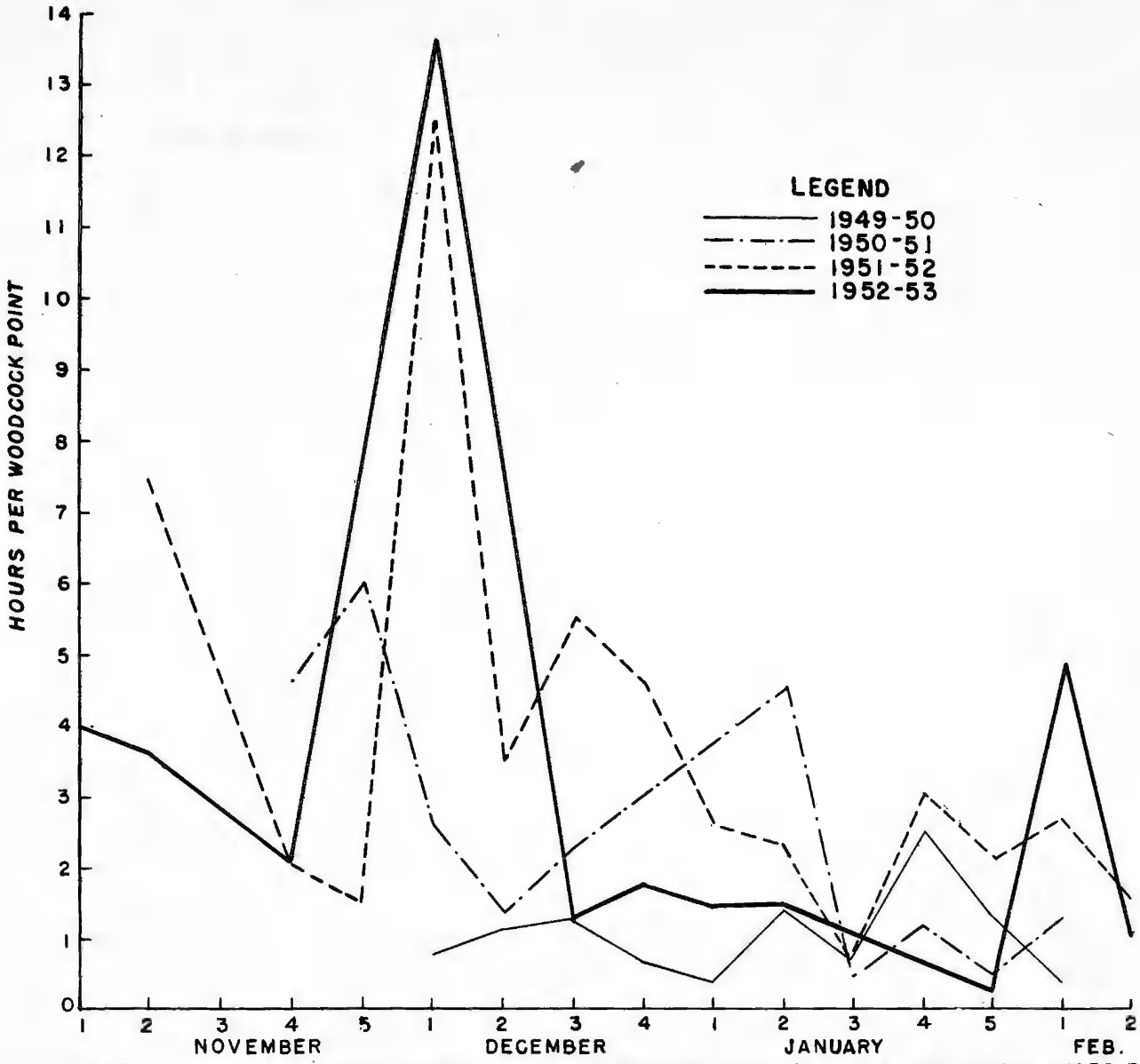

FIG. 1 HOURS PER WOODCOCK POINT BY WEEKS, WINTERS, 1949-50 THROUGH 1952-53.

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Peak numbers of woodcock were observed the fifth week in January 1953. The dogs averaged a woodcock point per 18 minutes during this week. The best individual count was made on January 25, 1953, when the dogs averaged a point for every 7 minutes afield. The peak week in 1951-52 was the third week in January with a point every 36 minutes, and the best day was January 17, 1952 with a point every 15 minutes.

The best individual counts by dates for the winters 1949-50 through 1952-53 are shown in table 3. During the four-year period, the highest individual counts were made on calendar dates from January 15 to February 5.

Summary of the counts by weeks indicates that there is a general movement of woodcock into this area from the fourth week in November through the second week in December (table 4). However, there is a short period between the third week in January and the first week in February when woodcock are noticeably more abundant. This high occurred the first week in February, 1949-50, the third week in January, 1950-51 and 1951-52, and the fifth week in January, 1952-53. The pattern is fairly consistent for the four years (fig. 1).

Table 3.--Dates of highest woodcock counts with bird dogs, winters 1949-50 through 1952-53

Winter	Date highest count	Hours per woodcock
1949-50	Feb. 5, 1950	0.33 (20 minutes)
1950-51	Jan. 15, 1951	0.25 (15 minutes)
1951-52	Jan. 17, 1952	0.25 (15 minutes)
1952-53	Jan. 25, 1953	0.11 (7 minutes)

Table 4.--Hours per woodcock point by weeks for the winters 1949-50 through 1952-53

Week	Hours per point			
	1949-50	1950-51	1951-52	1952-53
Nov. 1st week	.....	.....	.....	4.00
2nd week	.....	.....	7.5	3.75
3rd week	.....	.....	.....	.....
4th week	.....	4.7	2.0	2.0
5th week	.....	6.0	1.5	.....
Dec. 1st week	0.8	2.6	12.5	13.75
2nd week	1.1	1.4	3.5	.....
3rd week	1.3	2.3	5.6	1.4
4th week	0.8	.....	4.6	1.8
Jan. 1st week	0.6	.....	2.6	1.5
2nd week	1.4	4.5	2.4	1.5
3rd week	0.8	0.5	0.6	.....
4th week	2.5	1.1	3.0	0.7
5th week	1.3	0.6	2.3	0.3
Feb. 1st week	0.4	1.3	2.7	5.0
2nd week	.....	.....	1.6	1.0

Weather

Inventory information accrued over the four-year period shows the importance of fall and winter rains in conditioning the piney woods section of west-central Louisiana as favorable woodcock habitat. Table 5 shows the rainfall in inches, October through February, and the average number of hours per woodcock point for the season. The precipitation records are for the Leesville, Louisiana weather station which is close to the areas under observation. The dogs averaged a woodcock point per hour when fall and winter rains totaled 18 inches or more. When fall and winter rains dropped to 11 inches, as they did in 1951-52, the dogs averaged only a point per two hours afield.

Precipitation totaled greater than 30 inches in the winter 1949-50. Woodcock counts were consistently good in this area from December 1 to February 7, 1950. The dogs averaged a point per 1.4 hours or less afield all during this period except for the fourth week in January when the count rose to a point per 2.5 hours dog work (fig. 1). As a result of the heavy rains, the branches, bay galls, ravines, small creek and stream bottoms that finger through the piney woods contained water. The boggy hillsides, blackjack hillsides and post oak flats were moist. Feeding conditions were excellent for woodcock throughout the piney woods during the winter months. These favorable habitat conditions were, no doubt, responsible for holding the good woodcock numbers in this area all during the winter of 1949-50.

Table 5.--Precipitation in inches as recorded at the Leesville, La., weather station and woodcock inventory figures for the winters 1949-50 through 1952-53

Winter	Months						Hours per woodcock point
	Oct.	Nov.	Dec.	Jan.	Feb.	Total	
1949-50	7.74	0.28	8.69	5.23	10.27	32.21	1.1
1950-51	1.71	2.47	1.82	10.82	1.98	18.80	1.1
1951-52	0.16	3.07	3.86	2.91	1.25	11.25	2.1
1952-53	0.00	7.01	6.11	1.86	7.31	22.29	1.2

Sex Ratio

Twenty-four woodcock were collected during the winter. Thirteen of the birds were males; 11 were females.

Weights

The average weight of the 13 males was 149.1 grams. The heaviest bird weighed 168 grams; the lightest, 125 grams. The 11 females averaged 196.3 grams. The heaviest bird weighed 210 grams and the lightest weighed 180 grams. During the period December 1, 1948 and January 26, 1949, Goodrum weighed and sexed (post-mortem) 23 woodcock, 15 females and 8 males. The females ranged in weight from 210 grams to 143 grams with an average of 172.8 grams. The males ranged in weight from 188 grams to 143 grams with an average of 159.2 grams.

Supplemental Observations

West Florida.--In addition to the observations made in west-central Louisiana, November 19 to 23 was spent inventorying a portion of the quail management area, Eglin Air Force Base, Walton County, Florida. The dogs worked 14.08 hours on the area and made 8 woodcock points for an average of one woodcock point per 1.7 hours afield.

A post-hunting season quail count was made over practically the same area from March 2 to 5, 1953. The dogs worked 16.25 hours on this round and made 4 woodcock points. They averaged a woodcock point per 4 hours. Twice as many birds were found on the inventoried area in November as were found on it in March. Goodrum observed woodcock on the quail management area at the Base in the winter 1951-52.

Summary

1. In 223.3 hours of field work with bird dogs in the longleaf pine region of west-central Louisiana during the winter 1952-53, 172 woodcock were located.

2. The 1952-53 inventory shows a 50 percent increase over the 1951-52 figure for the dogs only averaged a point per 2.1 hours in 1951-52.

3. The number of woodcock found in 1952-53 (point per 1.2 hours) compares favorably with the inventory figures of 1950-51 and 1949-50 when the dogs averaged a point per 1.1 hours afield.

4. The first woodcock were noted on November 5, 1952 in Vernon and Rapides Parishes.

5. The peak number of woodcock occurred the fifth week in January (averaging a point per 18 minutes). The best individual count was made on January 25, 1953 with a point per 7 minutes.

6. Summary of the four years inventory data shows peak woodcock numbers in this area beginning the third week of January and continuing at least to the second week of February. Best individual counts were made between January 15 and February 5.

7. Fall and winter rains are important in conditioning woodcock coverts in the piney woods section of Louisiana. Best counts were made when fall and winter rains totaled more than 18 inches; when precipitation totaled only 11 inches, the woodcock count decreased by 50 percent.

8. Twenty-four woodcock were collected; 13 were males and 11 were females.

9. The 13 males averaged 149.1 grams; the females averaged 196.3 grams. The weights of 23 birds collected in 1948-49 were: average for males, 159.2; average for females, 172.8.

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OBSERVATIONS OF WOODCOCK BREEDING IN CERTAIN SOUTHEASTERN STATES

Vincent H. Reid and Phil Goodrum

U. S. Fish and Wildlife Service

Louisiana.--On February 9, 1950 Edgar McKee, Leesville, Louisiana, flushed a female woodcock from a nest with one egg while quail hunting near Anacoco, Vernon Parish, Louisiana.

While conducting a quail inventory on the Red Dirt Game Refuge, Natchitoches Parish, Louisiana, on March 24, 1950, two feigning female woodcock were flushed at separate locations. No young were found with the first bird flushed, but one young bird, judged to be 2-3 weeks old, was found with the second female. When approached, the young bird made a short flight of about 10 yards. W. C. Shankle of Leesville, Louisiana, accompanied Reid on the inventory work and saw the young woodcock. On April 26, 1950, Reid and H. C. Beasely noted woodcock probings of two definite sizes on newly ploughed quail food strips in the same general area on Red Dirt. The smaller probings were presumably those of young birds. There were probably more young birds on the area than the one found while conducting the quail census.

The quail study area on the Red Dirt is approximately 1300 acres in size. Although it was inventoried in March 1951 and 1952, as it was in 1950 when the young bird was found, no woodcock were seen. However, woodcock were found again on the quail census in the spring of 1953. Nine woodcock were seen from April 3 to April 8, 1953. Either by actual handling or close observation, 4 of the birds were known to be young of the year. Three of the adult birds were feigning females. Undoubtedly there were more young on the area than those located by the dogs.

The return of breeding woodcock to the study area was probably prompted by the prescribed November burn accomplished on the area by the Forest Service. The fire removed the old dead grass mantle and exposed the mineral soil on many favorable woodcock feeding spots in the area.

In addition to finding the young woodcock on the quail study area in the spring of 1953, young birds were also found along a small branch near Camp Hood, Vernon Parish, Louisiana, April 14, 1953. In the company of J. D. Newsom and J. B. Kidd, biologists, P-R Section, Louisiana Department of Wildlife and Fisheries, two feigning females and six young birds were found. The young birds were judged to be from 4-5 weeks old and capable of strong flight.

Record of breeding woodcock in west-central Louisiana was obtained in the spring of 1952 also. On April 8, 1952, 12 woodcock were flushed ahead of the dogs along Sieper Creek near Flatwoods in Rapides Parish. Three of the birds were feigning females. Either by actual handling or close observation, 9 of the birds were judged to be young of the year. The young were about 4 weeks old; only a trace of downy feathers remained about the head.

Mississippi.--On March 6, 1950 Goodrum flushed an adult female from the base of a whitebay shrub on the Leaf River Refuge, DeSoto National Forest, Mississippi. Three downy young were found near the white bay. Again on April 7, 1952, Goodrum saw a feigning female two miles west of the 1950 observation.

Georgia.--In March 1952, three miles west of Marietta, Georgia, L. E. Foote observed one active singing ground. Again on March 21, 1953 he located three singing grounds in the same location. On June 15, 1952, he saw one adult bird in this area.

On February 28, 1953, Edward E. Hueske saw a female woodcock sitting on three eggs, two miles west of Smyrna, Georgia in Cobb County along Nicka Jack Creek.

WOODCOCK SINGING COUNTS, EASTERN CANADA, 1953

Victor E. F. Solman

Canadian Wildlife Service

Spring counts of singing male woodcock have been made in selected areas in eastern Canada during the last half of April and the first half of May for the past several years. During 1953 such counts were made in Ontario, Quebec, Nova Scotia, New Brunswick, and Prince Edward Island.

In all cases the counts were made by reliable observers including officers of the Canadian Wildlife Service, the Wildlife Management Institute, Provincial game departments, members of the Royal Canadian Mounted Police and other volunteer observers.

The number of singing male woodcock in an area has not been definitely related to the breeding population of the area. In the absence of any other easily determined, reliable population index for the species, counts of singing males taken annually under comparable conditions are considered to indicate trends in the woodcock populations in the areas under study.

Table 6 furnishes a summary of the 1953 information for comparison with 1952 data, and with average conditions representing a number of years' records for identical areas.

Table 6.--Total singing counts for eastern Canada

	1952	1953	Average
Ontario	32	29	38.1
Quebec	13	11	13.3
New Brunswick	153	131	144.2
Nova Scotia	37	34	32.9
Prince Edward Island	29	51	40.0
Eastern Canada	264	256	268.5

Table 7.--Numbers of singing male woodcock, Canada

Region	Census Area	1952	1953	Av.	Number of yrs.	Observer in 1953
Ontario						
Ottawa	Stittsville (2 areas)	10	12	11	2	R.D.Harris
"	Old Chelsea	4	2	3.0	2	"
"	Vars	3	3	7.0	11	"
"	Hawthorne	1	0	2.0	3	F.H.Schultz R.deGrosbois
"	Carp	2	0	3.1	8	V.E.F.Solman
"	" #2	2	3	2.5	2	W.E.Godfrey
Kingston	Cataraqui	0	1	0.6	5	G.M.Stirrett
"	Westbrook	2	1	3.4	5	"
"	Perth Rd.	1	3	1.5	5	"
"	Holleford	6	4	4.1	5	"
	Totals	32	29	38.1	2-11 yrs.	
Quebec						
Montreal	Marieville	1	0	1.0	3	L.Lemieux
"	Chambly	1	1	1.0	3	"
"	Mount Royal Cemetery	2	2	2.0	3	"
"	LaSalle Woods	9	8	9.3	3	"
	Totals	13	11	13.3	3	
New Brunswick						
Sackville	Rockport Rd.	12	9	11.4	5	G.F.Boyer
"	* Cookville Rd.	12	6	6	1	"
"	" " (old method)	--	-	7.0	5	"
"	* Aulac - July	--	5	5	1	"
Pineville	* Lockstead Rd.	--	9	9	1	"
St. John	Tilley Rd.	38	19	29.0	16	"
Moncton	Turtle Creek	26	25	34.2	6	"
Tabusintac	Price Sett. Rd.	25	13	14.1	13	"
Fredericton	Richibucto Rd. (new)	52	65	55.5	3	B.S.Wright
"	* " "	--	30	30	1	"
"	* Kingsley Br.	--	14	14	1	"
"	* Charters Sett.	--	17	17	1	"
	Totals (not including *)	153	131	144.2	3-16 yrs.	
Nova Scotia						
Truro	New Annan Rd.	15	16	12.7	4	B.C.Carter
"	Camden Rd.	6	7	5.5	4	"
"	Wentworth Rd.	16	11	14.7	3	"
	Totals	37	34	32.9	3-4 yrs.	
Prince Edward Island						
	Avondale	6	4	8.3	6	A.M.Johnson
	Fortune	14	18	10.7	13	"
	French Village	4	4	8.4	13	"
	Conway	5	25	13.1	13	"
	Totals	29	51	40	6-13 yrs.	

* Stops at 0.5-mile intervals.

WOODCOCK CENSUS STUDIES IN NORTHEASTERN UNITED STATES, 1953

Howard L. Mendall

Maine Cooperative Wildlife Research Unit

During the spring of 1953, as in previous years, the writer served as coordinator of the woodcock census studies that were conducted in the New England States and New York.

This year it was decided by the compilers of census data to try out a number of marked changes in the census technique. Instead of determining total counts of singing woodcock along each census route, a sample was to be obtained. Principal reasons for the changes were to standardize the method of obtaining data, to permit better statistical analysis, and to eliminate as many as possible of the errors that are bound to result by using a technique based primarily upon sound.

In the new system of tabulating the data, the population index is the number of woodcock heard per stop per route.

Unfortunately there will be no satisfactory basis for comparison until next year. However, in order not to lose an entire season of population data, censuses were conducted on a few routes by the old technique, as well as the new. On 15 areas in Maine, Massachusetts, and New York, a total of 266 singing woodcock was recorded. On these same areas there were 262 birds in 1952. Thus based on this very small sample, little change in the status of breeding woodcock was evident. A slight increase in Maine was offset by a slight decrease in Massachusetts, with practically no change in New York.

The complete census data for this year are presented in Table 8. It was very gratifying to note the willingness shown by the cooperators in using the new technique. In many instances considerable revision in census routes was necessitated in order to meet the length requirements. An examination of the data sheets indicated a minimum of irregularities in spite of the fact that it is obvious the directions need slight clarification in several respects before another year.

A special study was conducted by the Maine Cooperative Wildlife Research Unit to determine the number of known birds not heard by using the new method. Censuses were run on 14 of the central and eastern Maine areas by both the old and the new techniques. Assistance in this study was given to the Unit by personnel of the Moosehorn Refuge under Merton Radway, by State Biologists Peppard and Fitzpatrick, and by John M. Dudley of Calais.

Table 8.--Woodcock singing ground counts in northeastern States, 1953

State	Census route	County	Number of stops per trip	Av.number of birds per trip	Av.birds per stop per trip	Observer in 1953
Me.	Calais	Washington	5	6	1.2	H.Mendall
"	Charlotte I	"	7	12	1.7	"
"	Charlotte II	"	8	9	1.1	"
"	Meddybemps I	"	5	6	1.2	"
"	Meddybemps II	"	6	3	0.5	"
"	Alexander	"	5	3	0.6	J. Dudley
"	Cooper	"	8	8	1.0	H. Mendall
"	Edmunds I	"	9	8	0.9	M. Radway
"	Edmunds II	"	9	3	0.3	A. Davis
"	Edmunds III	"	6	2	0.3	"
"	East Machias	"	11	8	0.7	W. Buckley
"	Machias River	"	10	11	1.1	"
"	Jonesboro	"	11	14	1.3	"
"	Hodgdon	Aroostook	8	5	0.6	H. Mendall
"	Oxbow	"	15	8	0.5	H. Carson
"	Ashland	"	13	13	1.0	"
"	Wade	"	9	5	0.6	"
"	T7 R5, W	"	10	5	0.5	F. Dunn
"	Island Falls	"	9	7	0.8	"
"	Lamoine	Hancock	8	5	0.6	C. Barrett
"	Trenton	"	10	11	1.1	R. Parks
"	Bar Harbor	"	7	7	1.0	"
"	Gouldsboro	"	8	9	1.0	"
"	Orland-Surry	"	10	9	0.9	"
"	Amherst	"	10	10	1.0	J. Peppard
"	Dedham	"	7	5	0.7	M. Coulter
"	Alton	Penobscot	12	10	0.8	W.Fitzpatrick
"	Greenbush	"	10	18	1.8	C. Westfall
"	Orono	"	12	3	0.3	H. Quick
"	Mt. Chase	"	10	7	0.7	F. Dunn
"	T4 R10	Piscataquis	6	7	1.2	H. Taylor
"	Detroit	Somerset	9	5	0.6	D. Holmes
"	New Portland	"	10	4	0.4	H. Spencer
"	Coplin	Franklin	10	7	0.7	"
"	Salem	"	8	6	0.8	"
"	South Hiram	Oxford	7	3	0.4	R. Hoffman
"	Sandy Point	Waldo	9	5	0.6	D. Holmes
"	St. George	Knox	11	4	0.4	H. Blanchard
"	Dresden	Lincoln	7	5	0.7	E. Baker
"	Topsham	Sagadahoc	9	7	0.8	"
"	Gardiner	Kennebec	11	9	0.8	W. Harris

Table 8.--Woodcock singing ground counts in northeastern States, 1953--Continued

State	Census route	County	Number of stops per trip	Av.number of birds per trip	Av.birds per stop per trip	Observer in 1953
Me.	Togus Pond	Kennebec	13	2	0.2	H.Blanchard
"	Litchfield-Bowdoin	"	10	5	0.5	"
"	North Berwick	York	9	9	1.0	R.Hoffman
"	Waterboro	"	9	3	0.3	"
N.H.	Pittsburg	Coos	8	7	0.9	F.Scott
"	Hopkinton	Merrimack	7	5	0.7	H.Siegler
Vt.	Highgate	Franklin	5	5	1.0	R.Minns
"	Swanton	"	7	7	1.0	"
"	Shrewsbury	Rutland	15	17	1.1	H.Colton
"	Mendon	"	11	7	0.6	"
"	Granville	Addison	10	9	0.9	"
"	Concord	Essex	7	8	1.1	R.Seamans
"	Victory	"	10	17	1.7	"
"	Halifax	Windham	8	6	0.8	"
"	Ripton	Addison	12	13	1.1	R.Fuller
Mass.	Gate 40-Quabbin	Worcester	16	16	1.0	W.Sheldon
"	MDC - Quabbin	"	10	12	1.2	"
"	Prescott *	Hampshire	28	27	1.0	"
"	Leverett	Franklin	9	14	1.6	"
"	Newburyport	Essex	6	11	1.8	R.Norris
Conn.	Canaan	Litchfield	6	5	0.8	W.Sondrini
"	Litchfield I	"	6	5	0.8	R.Billard
"	Litchfield II	"	6	4	0.7	"
"	Barkhamsted I	Hartford	11	3	0.3	A.Lamson
"	Barkhamsted II	"	11	7	0.6	"
"	Glastonbury I	"	9	4	0.4	M.Belden
"	Glastonbury II	"	6	3	0.5	"
"	Farmington	"	6	3	0.5	R.Billard
"	North.Branford	New Haven	6	3	0.5	O.Beckley
"	Guilford	"	6	5	0.8	"
"	Eastford	Windham	7	4	0.6	Univ.Conn.
"	Shenipsit II	Tolland	7	3	0.4	M.Belden
"	Shenipsit III	"	7	1	0.1	"
"	Portland I	Middlesex	6	5	0.8	M.Arnold
"	Portland II	"	7	4	0.6	"
"	Montville	New London	6	3	0.5	B.Wheeler
N.Y.	Westerlo	Albany	7	5	0.7	C.Brown
"	Berne	"	5	4	0.8	"

* Several routes combined.

Table 8.--Woodcock singing ground counts in northeastern States, 1953--Continued

State	Census route	County	Number of stops per trip	Av. number of birds per trip	Av. birds per stop per trip	Observer in 1953
N.Y.	Guilderland-Knox	Albany	4	3	0.8	J.Dell
"	Bethlehem	"	6	4	0.7	R.Smith
"	Conn. Hill I	Tompkins	6	6	1.0	M.Brumsted
"	Conn. Hill II	"	5	7	1.4	O.Hewitt
"	Conn. Hill III	"	4	4	1.0	"
"	Conn. Hill IV	"	4	3	0.8	H.Adams
"	Indian Lake	Hamilton	6	8	1.3	C.Brown
	Totals		735	598	0.8	

On most of these test areas, censuses were run by each method on the same night. The findings are given in Table 9. It was found that on all the areas combined 65 percent of the total birds present along the route could be recorded by the sampling method. Considerable variation was noted, however, ranging all the way from a low of 30 percent to a high of 89 percent. In general, those areas that are largely in open, rather level country, and having a minimum of disturbing noises (i.e. traffic, dogs, frogs), showed the highest proportional count by the new technique. By contrast, on routes having a maximum of hills and ridges the percentage was very low. Even in open country the presence of knolls cuts down noticeably on the distance woodcock calls can be heard. In establishing new census routes this point should be taken into consideration.

In spite of the loss, in volume, of data by use of the new method, it would appear from the 1953 studies that this loss is more than offset by increased coverage as well as by results that are much more standardized and can be more easily compared--route by route. Moreover, the quantitative loss is not as great as it would appear; it is partly made up by the fact that census takers can cover slightly longer routes in an evening by the new technique.

As a final point of interest mention may be made relative to the recording of ground calls versus flight songs. From the statistical standpoint, it is desirable to utilize only ground calls but physical conditions sometimes render this impossible. This year the census takers indicated that on 59 percent of their routes all data consisted of ground calls only.

The planning and organization within the various states of the cooperator areas in 1953 was as follows: Maine, by the writer, assisted by Kenneth Hodgdon and J. William Peppard of the Maine Department of Inland Fisheries and Game, and Malcolm Coulter of the Maine Unit; New Hampshire, by Hilbert Siegler and Fred Scott of the New Hampshire Fish and Game Department; Vermont, by Roger Seamans of the Vermont Fish and Game Service, with Ralph Minns, U. S. Fish and Wildlife Service, handling the Highgate and Swanton areas; Massachusetts, by William Sheldon, Massachusetts Cooperative Wildlife Research Unit, assisted by Russell Norris, U. S. Fish and Wildlife Service, on the Newburyport area; Connecticut, by Mason S. Belden, Connecticut Board of Fisheries and Game; New York, by Charles P. Brown, New York Conservation Commission.

Table 9.--Special woodcock census studies, Maine, 1953
(A Comparison of Census Methods)

Area	Length of route	Number of birds old method * (total count)	Number of birds new method + (sample count)	Percent of total birds obtained by new method
Amherst	3.6 mi.	16	10	63
Alton	4.8 mi.	19	10	53
Greenbush	3.6 mi.	22	18	82
Hodgdon	3.0 mi.	7	5	71
Alexander	2.0 mi.	8	3	38
Cooper	3.6 mi.	11	8	73
Calais	2.1 mi.	8	6	75
Charlotte I	2.5 mi.	17	12	71
Charlotte II	3.8 mi.	12	9	75
Meddybemps I	2.0 mi.	9	6	67
Meddybemps II	3.1 mi.	5	3	60
Edmunds I	4.3 mi.	9	8	89
Edmunds II	4.1 mi.	10	3	30
Edmunds III	2.1 mi.	6	2	33
Totals of 14 areas		159	103	65

* The average of 3 continuous counts along the census route.

+ The average of 3 counts, each made at a number of stopping points no less than 4 tenths of a mile apart, along the same route as above.

WOODCOCK SINGING GROUND COUNTS IN CENTRAL-EASTERN UNITED STATES, 1953

P. F. English

Pennsylvania State College

The following agencies and their aides participated in the gathering of data here presented.

Board of Game and Fish Commissioners, Dover, Delaware.
Game and Inland Fish Commission, Baltimore 2, Maryland.
Wildlife Resources Commission, Raleigh, North Carolina.
Department of Conservation and Economic Development, Trenton 7, New Jersey.
Department of Natural Resources, Columbus, Ohio.
Pennsylvania Game Commission, Harrisburg, Pennsylvania.
Pennsylvania Cooperative Wildlife Research Unit and Department of Zoology, State College, Pennsylvania.
Conservation Commission, Charleston, West Virginia.
Department of Fish and Wildlife Resources, Frankfort, Kentucky.

It is noted that Pennsylvania has established ten new stations this year, these by the Wildlife Research Division of the Pennsylvania Game Commission, which agency now has a woodcock project on its agenda.

Kentucky got in late this past season but hopes to do much more on this next year.

In Ohio, Rt. #8 seems way out of line in comparison to all other areas in the region. It appears from conversation with Merrill C. Gilfillan of the Department of Natural Resources in Ohio who visited this area that they are exceptionally high during this period and that numerous nests are found on this area which is a sanctuary. The soil is very rich and the earthworm population is high.

Three lines that were run in West Virginia in 1952 were not run in 1953.

Table 10.--Singing ground counts, central-eastern States

State	Census Area	County	No. Occupied Singing Grounds 1952	1953	Observers, 1953
Del.	Petersburg	Kent	5	4	E.B.Chamberlain
"	Gotts Road	New Castle	13	8	Burd S. McGinnes
Md.	Pocomoke River	Worcester	7	8	Geo. A. Jones
"	Drum Point	Calvert	2	3	J. R. Longwell
N.C.	New Hope Farm	Chatham	3	10	D. J. Hankla
"	Glen Alpine to Power Plant	Burke	1	1	Mr.&Mrs.E.R.Smith
"	Southern R.R.Tracks	"	2	2	E. R. Smith
"	Highway 70	"	1	1	"
"	Hoffman-Jackson Springs	Richmond	1	1	David L. Taylor
"	Old North Main Street	Henderson	3	5	Rex L. Bird
"	Tracy Grove Road	"	3	3	"
N.J.	Archer Corner Colliers Mills	Ocean	1	2	Paul D. McLain
"	Tuckahoe Area	Cape May	8	7	F. Ferrigno
"	Walpack-Bevans	Sussex	4	6	Russell A. Spinks
"	Haleysville P.S. Grounds	Cumberland	5	5	E. G. Bevan
Pa.	Barrens	Centre	2	3	W.M. & L. Sharp P.F. & E.M.English
"	Stone Valley	Huntingdon	4	8	W.M. & L. Sharp P.F. & E.M.English
"	Davenport Farm Rd.	Perry	-	2*	Robert L. Snyder
"	R. Junc. 466 & 359 to 422	"	-	4*	"
"	Horse Valley Road	Franklin	-	6*	Glen L. Bowers
"	Hammer Hollow	Juniata	-	2*	Warren B. Taylor
"	2 miles N.W.Atkinson	Mifflin	-	6*	J. W. Taylor
"	Rt. 220-Bald Eagle Sta.	Centre & Blair	-	8*	W. C. Richter
"	Rt. 220 from Fowler Hollow	Centre	-	7*	Otis Robbins
"	Rt. 220 from R.R. iron bridge (near Milesburg)	"	-	8*	S.A.Liscinsky
"	Rt. 220 from lane to Julian	"	-	5*	C.R.Studholme
"	Rt. 220, near Unionville	"	-	7*	C. Purnell

Table 10--Continued

State	Census Area	County	No. Occupied Singing Grounds 1952	1953	Observers, 1953
W.Va.	Kumbrabow Forest	Randolph	9	7	John Gill
"	Leading Creek	"	1	0	Stricker
"	Bayard-Henry	Grant	13	9	R.C. Kletzy & Ted Judy
"	Clawson	Pocahontas	3	2	Wayne Bailey
"	Mt. Tabor Road	Raleigh	3	4	T.R. & N. Samsell
"	Rt. 45/5 South	Hampshire	6	4	David Gilpin & George Lewis
"	Old Town to Igloo	Mason	2	6	Herbert Dahl
"	State Route 32	Tucker	4	2	W. R. DeGarmo
Ohio	Rt. #1-Austinburg	Ashtabula	7	6	M.L., M.D., & M.C.Gilfillan
"	Rt. #2-Dorset	"	6	7	M.L., M.D., & M.C.Gilfillan
"	Rt. #3-Morgan	"	6	6	M.L., M.D., & M.C.Gilfillan
"	Rt. #4-Andover	"	15	12	M.L., M.D., & M.C.Gilfillan
"	Rt. #5-Ashtabula	"	25	20	M.D. & M.C.Gilfillan,
"	Rt. #6-Franklin	Portage	4	4	R.W. Dexter & C.L.Bliss
"	Rt. #7-Mentor	Lake	9	5	Gilbert & Georgia Ives
"	Rt. #8-Castalia	Erie and Sandusky	-	65*	Roger H. McElroy
Ky.	Sand & Hedrick Rd.	Bath	-	2*	Arnold Mitchell

* Newly established stations in 1953.

In table 11 is shown a comparison of counts by states for 1952 and 1953.

Table 11.--Comparison of woodcock data for central-eastern States, 1952-53

State	1952 count (total birds for all routes)	1953 count (total birds for all routes	Change (in birds for all routes)
Delaware	18	16	-2
Maryland	10	11	+1
North Carolina	14	23	+9
New Jersey	19	20	+1
Ohio	72	60	-12
Pennsylvania	6	11	+5
West Virginia	49	36	-13

WOODCOCK BREEDING GROUND COUNTS IN CENTRAL-NORTHERN UNITED STATES, 1953

John W. Aldrich

U. S. Fish and Wildlife Service

During the past breeding season we were fortunate in having the most observations on the woodcock that we have had in the three years of this study in the Central Northern section of the United States--including Michigan, Wisconsin, and Minnesota. This year a change was made in the prescribed method of making the count. This involved counting only those birds heard at definite stops during 2 minute listening intervals. To obtain this figure all of the birds recorded on all trips over the same route were totaled and divided by the total number of stops made on all trips. The results were interpreted as average number of birds heard per stop per trip. Because of the change in the methods of making and interpreting the counts this year only this year's data are presented in table 12 and no effort is made here to compare these with last year's results.

This year we were fortunate to have an active woodcock investigation in progress in the State of Michigan. Lyle K. Blankenship has summarized the results of these studies in another paper in this issue (p. 41) and has included some comparisons of this year's count with last year. They indicated about a 20 percent increase over last year. Also Robert A. McCabe in a letter reported an 18 percent increase on 1,100 acres in Wisconsin over last year. It is hoped that next year a substantial number of routes ran this year in all states will be run again on the basis used this year and that we will have good comparable data for a region wide appraisal.

Again we gratefully acknowledge the assistance of the conservation departments of these three states and to all the observers who made the counts and who are listed in table 12.

Table 12.--Woodcock breeding ground counts in central-northern region, 1953

Locality of route	Observer	Total birds heard all trips	Total number of stops all trips	Av. number birds per stop per trip	Inclusive dates
Michigan					
Alger Co., Shingleton	T.J.Peterle	17	30	.566	5/13-5/17
Allegan Co., Ely L.Rd. Allegan	O.L.Haugen	1	16	.062	5/5-5/12
Allegan Co., Gables Corners, Allegan	"	2	15	.133	5/4-5/13

Table 12.--Woodcock breeding ground counts in central-northern region, 1953--Continued

Locality of route	Observer	Total birds heard all trips	Total number of stops all trips	Av. number birds per stop per trip	Inclusive dates
Michigan					
Chippewa Co., Johnswood	L. G.Schemenauer	43	30	1.433	5/3-5/6
Clinton Co.,Rose L. Experiment Station	L.H.Blankenship	17	10	1.700	4/20-5/11
Dickinson Co.,T43N-R30W; T43N-R29W	I.Thomson	28	30	.933	5/5-5/9
Dickinson Co., Channing	Mrs.R.L.DeBayner	29	21	1.381	5/9-5/18
Gladwin Co., Gladwin	M.Gazlay	25	33	.758	4/23-5/8
Gratiot Co.,Gratiot-Saginaw Game Area	L.H.Blankenship	32	30	1.067	4/11-5/14
Houghton Co.,Sidnaw	R.R.Rafferty	23	21	1.095	5/3-5/15
Ingham Co.,Dansville State Game Area #1	H.Dykema	2	18	.111	5/3-5/19
Ingham Co.,Dansville State Game Area #2	V.Janson	4	18	.222	4/28-5/13
Ingham Co.,Dansville State Game Area #3	W.Goudy	7	30	.233	4/29-5/19
Iron Co., Channing	C.T.Dubovsky	44	33	1.333	5/4-5/7
Isabella Co., Mt. Pleasant #1	I.F.Jorae	35	24	1.458	4/22-5/3
Isabella Co., Mt. Pleasant #2	"	22	27	.815	4/28-5/4
Isabella Co., Mt. Pleasant #3	"	22	27	.815	5/6-5/8
Isabella Co., Mt.Pleasant #4	Mr.&Mrs.W.Creger	22	42	.524	4/30-5/7
Kalamazoo Co.,Alamo	Gladys Hall	28	33	.848	5/3-5/11

Table 12.--Woodcock breeding ground counts in central-northern region, 1953--Continued

Locality of route	Observer	Total birds heard all trips	Total number of stops all trips	Av. number birds per stop per trip	Inclusive dates
Michigan					
Kalamazoo Co. Kalamazoo	Gladys Hall	32	36	.889	5/7-5/13
Luce Co., Newberry	Dr. G.A. Ammann	9	11	.818	5/4
Otsego Co., Gaylord	O. Failing	5	24	.208	4/9-5/3
Roscommon Co. T23N R4W	W. Palmer	16	10	1.600	4/5
Roscommon Co. T22N R4W	"	41	38	1.079	4/1-5/4
Roscommon Co., Houghton L.	S. DiAngelo	21	9	2.333	4/2-4/21
St. Joseph Co., 7S, R12W	J. Linder	12	16	.750	4/27-5/11
Van Buren Co., Almena	Gladys Hall	42	33	1.273	5/3-5/11
		581	665	.874	
Minnesota					
Cook Co., Grand Marais	M. Stenlund	5	11	.455	5/9
Martin Co., Fairmont	D. Ledin	2	33	.061	5/9
Murray Co., Currie	G. Bue	0	9	0	4/22
Ottertail Co. Fergus Falls	O. Norman	0	11	0	5/4
Pope Co., Gilchrist	R. Benson	0	7	0	5/21
Pope Co. Minnewaska	"	0	8	0	5/18
St. Louis Co., Duluth	P. Hofslund	18	24	.750	5/4-5/13
Winona Co., Beaver	J. Bronoel W. Longley	8	18	.444	4/24-5/11
		33	121	.273	

Table 12.--Woodcock breeding ground counts in central-northern region, 1953--Continued

Locality of route	Observer	Total birds heard all trips	Total number of stops all trips	Av.number birds per stop per trip	Inclusive dates
Wisconsin					
Langlade Co.,Ackley	F.Irving	50	60	.833	4/26-5/11
Price Co. Eisenstein	R. Hanson	8	20	.400	4/21-5/5
		58	80	.725	
Grand Total . . .		672	866	.776	

SUMMARY OF MASSACHUSETTS WOODCOCK STUDIES, 1953

William G. Sheldon *

Massachusetts Cooperative Wildlife Research Unit

Massachusetts woodcock trapping and banding studies were continued throughout the spring months for the fourth consecutive year. Heavy precipitation curtailed activities during late March and April. Including chicks and returns from former years, 149 woodcock were captured.

In addition to the trapping activity, a graduate student, Herbert Maxfield, is making a detailed ecological study of winging grounds and spring feeding coverts. This phase of work was begun two years ago by the writer. Vegetative features, earthworm counts, and soil analyses are included in this special investigation.

Every effort will be made to evaluate woodcock breeding and summer habitat with the objective of eventually making an inventory of such areas in the state. Also, of fundamental importance from a long range management point of view, is the analysis of the relation of vegetative succession to woodcock breeding territories. The Massachusetts studies are being conducted in areas where rapid vegetative succession is taking place, and its effects on woodcock breeding population will soon be measurable.

Spring Behavior of Breeding Males

All 1953 records of repeats and returns on breeding males added corroborative evidence to results recorded in earlier reports.

Accumulative data on returns over a four-year period suggested that former calculations of population turnover based on the percentage of recaptured males banded in former years is too subject to error to be considered valid.

This year's trapping yielded the first information obtained in the study on the return of chicks to their rearing grounds. A male chick banded on its nest, just after hatching on May 2, 1952, returned with the first major influx of migrants in early April and occupied a singing site 200 yards from its hatching site of the previous year.

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* Cooperators: Ethan Howard, Jr., Gordon Hobart, Gardner Hobart, Robert Wood, Ernest Duart, Thomas H. Ripley, E. M. Pollack, R. Cronin, J. McDonough, C. R. McLaughlin, L. Campbell, Herbert Maxfield, Donald Blais, R. Norris.

Analysis of Changes in Census Method

For the sake of comparison with former years, Massachusetts census routes were run by the former method of counting occupied singing grounds and also the new method of counting birds per stop at 0.4 mile intervals or more. Since parts of the census routes are visited every evening all spring, the Massachusetts census figures by the former method logically are more accurate than would be possible if only three runs were made, as is the case in most census areas. Reducing the singing ground count to a bird per stop basis at 101 stops by the old method, 101 birds were counted, giving a calculation of 1 bird per stop. Over these same routes, by the new method, 55 birds were counted at 54 stops or 1.02 birds per stop. The difference of .02 birds per stop (2 percent) would appear to be negligible. To take full advantage of the new system, it would be possible to cover considerably more woodcock habitat in the same length of time required to run current routes by the old system.

To further test the new census method, an experimental run was set up on Prescott Peninsula as in former years. The new procedure was strictly adhered to throughout the spring. Twelve stops were made. The route was run in reverse order every other run. Of 20 runs made, 11 were not used because of adverse weather conditions or periods of the full moon. Based, therefore, on 9 runs, the count varied from a low of 7 on April 15 to a high of 12 on May 9.

For the third year in succession, a high count occurred soon after the end of the first week in May. Estimated hatching dates on 23 Massachusetts woodcock broods and observations of 18 nests over 4 years indicate that, depending somewhat on the early spring weather, the majority of nests hatdh between May 1 and May 7. Seventy percent of all broods found were hatched by May 15.

The reasons for the high May census counts are still speculative. Nevertheless, there appears to be some correlation between relatively low counts in the last two weeks of April when the majority of hens are incubating eggs and the high counts later in May when most of the hens are off the nests and accompanied by broods. It is possible the presence of broods in the vicinity of singing grounds may stimulate male performances. The writer feels the most likely theory is that hens, when not incubating, occasionally "peent." Unit personnel have two records with detailed field notes which give apparently indisputable circumstantial evidence of a female "peenting." In both cases, the observer was very close to a singing ground. Copulation was observed and, while the male was in flight, the female "peented" two or three times, but not regularly as is the case with the males. Summer observations recorded below suggest woodcock may often give vocal sounds when not in breeding condition.

Based on this year's experience, four additional refinements are suggested for census technique. The first two apply to Massachusetts only.

1. Use counts between April 15 and April 30 as index if only 3 runs can be made. Counts between these dates have been relatively consistent each year.

2. Cut the running time from 35 minutes to 30 minutes. Observations in 1953 indicated that in varying topography and intermittent openings, the light may vary sufficiently so there may be a difference of 4 minutes in the time birds begin their performances. In each census region, a sample of birds should be timed for length of performance before establishing the running time for different census routes.

3. Winds often increase during a run. Winds of 10 m.p.h. or more made hearing difficult. It is recommended, therefore, that runs should not be made when winds are 10 m.p.h. or over, rather than 15 mp.h. or over.

4. It is difficult to judge the effect of rain. On occasion it does not seem to affect the count. During this spring, constant cold rains in April virtually caused cessation of breeding activities in the evening. The lowest count on the Prescott run occurred April 26 in a dense fog when only one bird was heard. The recommended procedure is not to census during any kind of rain.

Martha's Vineyard Island

The writer found a very high breeding woodcock population in parts of Martha's Vineyard Island. Search of the literature indicates that the woodcock has always been recorded as a rare resident in this area of the state.

Broods were observed in green briar swamps, often in the same cover where quail take refuge. Broods were also observed in or near sapling stands of black locust, tree of heaven and arrow wood.

Early Summer Habitat and Behavior

Records of woodcock flushes during June and July reveal substantially the same type of habitat as used in the breeding period. Observations indicate that dense shade under conifers are often favored diurnal resting covers in hot weather. Complete cover records of summer habitat will be described in a later report.

Summer evening flights.--A very remarkable woodcock phenomenon was observed during July. In the summer of 1952, the writer discovered a section of road on Prescott Peninsula where at dusk several birds crossed from west to east every evening. It was suspected that more birds than actually observed took part in this movement. On July 8, 1953, the writer, with the help of three cooperators, stationed themselves at strategic places east of the road. Although one observer on the road counted only 12 birds, those east of the road counted a total of approximately 40 birds. The great majority flew northeast and disappeared at considerable height over the summit of another ridge.

It required approximately 10 subsequent evenings of following this line of flight to discover the destination of these birds. During this period lesser numbers from all points of the compass were observed flying at dusk to the same general locality.

The majority of the birds lighted in an old burn grown up to gray birch and blueberries. Many lighted directly in the blueberry bushes. The berries were not ripe and there was no evidence of feeding on the fruit by the woodcock. In one small field of less than half an acre as many as 20 birds lit. Many departed soon after lighting.

The phenomenon was not unlike what many hunters have described as the behavior of assumed migrants in the fall.

One old gravel pit in the area was wet and probings were present. A few birds lit in this each evening. Of 11 birds captured in blind butterfly traps in the pit, 2 were females on the basis of weights and bill lengths. One of these females was collected. It could not be determined whether the latter were strictly local birds. Two of the 9 males captured had been captured and banded earlier in July in a funnel trap, one and one-fourth miles to the west on the edge of a large alder swamp. Of particular interest was the observation of several birds leaving the edge of a large alder swamp at dusk and flying in the direction of the burn.

On July 21, 7 Japanese mist nets were set in one small field, and during the following week, 10 additional birds were captured. Many birds hit the nets and bounced out. In one evening, 9 birds hit nets, but only 3 became entangled. On the basis of bill lengths and 2 specimens, all were presumed males. Up to July 29 when the last bird was caught, there was no sign of moulting in these male birds, whereas both captured females were in full moult. One bird had a bill only 57 mm. long, suggesting it was a juvenile of the year.

Most of these males performed half-hearted courtship flights flying up in spirals and descending in the typical courtship manner. Although the wing twitter was very audible and indistinguishable from the spring flight, the true musical chirp note was not heard. Specimens examined had minute testes, and there was no evidence that this phenomenon could be related to any form of breeding.

Many of the birds "peented" erratically after lighting. Some of these uttered a "peent" typical of a breeding male. Others, possibly young birds, made a vocal sound not heard before. It can best be described as what a young bird might be expected to sound like when attempting to "peent"! One bird, while flying, was heard to make a "quack" note not unlike the sound a wounded bird makes when picked up by a hunter.

The birds were most active on hot nights when the temperature exceeded 70° F. Flights fell off rapidly by August 1, and regular

observations had not revealed further performances as late as September 5. The evidence suggested this was a crepuscular movement taking place at dusk and possibly dawn and not a migration. Dawn observations recorded the erratic return of many birds from east to west. Their dawn flights were not as directional and heavy as the evening flights.

Explanations for this flight are at present strictly speculative. One bird had a stomach filled with the larva of a species of beetle. However, since the lighting ground was very dry and hard it seems doubtful the flight was for dietary reasons. Many birds left excellent feeding areas to go to the burn. There were little piles of grit among the bushes, but grit is available in quantity on all the roads.

It is possible that such behavior may be part of the developmental process of young birds before the late summer moult takes place.

From a management point of view, the significance of this phenomenon must await further investigation. Several questions are posed by the observation. Is this performance carried on by woodcocks in other areas? What is the ecological significance of the cover used as a lighting area? Is such a cover an important ingredient of woodcock summer habitat?

Other Summer Bandings

In addition to the captures of the evening flight birds, approximately 12 captures were made in funnel traps set primarily for grouse. Two birds were recaptured in the same trap over an interval of several weeks suggesting these individuals had remained in the same location the greater part of the summer.

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INVESTIGATIONS ON WOODCOCK IN MICHIGAN

Lytle H. Blankenship

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Most of the information gathered on woodcock in 1953 pertains to singing ground counts and habitat analyses. The former were made by cooperators throughout the state. The latter were undertaken as a phase of a recently initiated research project on the bird. The study is being conducted by the writer, a graduate student of Michigan State College, under the sponsorship of the Michigan Department of Conservation's Game Division. Since the project is in its first few months very little information can be provided at this time. However, the following comments will serve as a partial summary of some of the work being done and may present some useful information for others.

The number of census routes has increased during the three years of running counts. Twenty-seven routes were run this year as compared to 14 in 1952 and 12 in 1951.

Two comparisons may be made from the singing ground data collected during the past two years. One such comparison includes all singing routes of each year; the other includes only data from routes run both years (Table 13). According to the first comparison the average number of birds heard per route increased from 6.4 in 1952 to 7.6 in 1953, indicating an increase of 1.2 birds per route throughout the state. The second comparison indicates a still greater increase of 1.5 birds per route. Several observers noted an evidently greater activity on certain routes this year, whereas others reported fewer birds. As a whole such data and general observations tend to indicate a slightly greater population of breeding woodcock in 1953 over the previous year.

The writer visited two special study areas as often as possible to run census routes and to observe singing ground activity. Figure 2 shows the results of the two routes. The data from the route in the Gratiot-Saginaw State Game Area (Gratiot County) indicate two population peaks while the figures from the route at the Rose Lake Wildlife Experiment Station (Clinton-Shiawassee Counties) show a nearly level plateau. However, the counts were probably started too late in both areas, particularly the Rose Lake area, to catch the early migration peak. No definite reason can be given at this time for the second peak * on the Gratiot-Saginaw route.

* Similar to the situation reported by Sheldon (Spec. Sci. Rept. Wildlife No. 14, 1952: 30-44.--Ed.

Table 13.--Census of Michigan woodcock singing grounds, 1952-53

County	1953 Counts 1st	2nd	3rd	Average	1952 Counts 1st	2nd	3rd	Average
Alger	5	6	6	5.7	7	6	5	6.0
"					7	5	6	6.0
Allegan	1	1	0	0.6				
"	1	0		0.5	2	2	0	1.3
"					1	4		2.5
Cheboygan					6	7	0	4.3
Chippewa	15	13	15	14.3				
Clinton-Shiawassee	4	6	7	5.7				
Dickinson	9	10	9	9.3				
"	10	8	11	9.6				
Gladwin	5	5	15	8.3				
Gratiot	9	13	10	10.7				
Houghton	6	8	9	7.7	5	5	5	5.0
Ingham	0	3	4	2.3				
"	0	2	2	1.3				
"	0	1	1	0.6				
Iron	13	18	13	15.3				
"					4	6	5	5.0
Isabella	8	14	13	12.0				
"	6	6	10	7.3				
"	6	11	5	7.3				
"	6	9	7	7.3				
Kalamazoo	7	11	10	9.3	11	7	12	10.0
"	11	11	10	10.7	8	6	11	8.3
Luce	9			9.0				
Otsego	2	1	2	1.7				
Roscommon	16	11	14	13.7	9	10	0	6.3
"	16			16.0				
"					4	6		5.0
"	7	7	7	7.0				
Schoolcraft					5	9	5	6.3
St. Joseph	5	3	4	4.0				
Van Buren	12	15	15	14.0	16	15	20	17.0
All routes	189	193	199	7.6	89	94	74	6.4
Routes ran both years	58	62	64	9.2	58	51	53	7.7

One other point to consider in figure 2 is the date when activity ceased completely on the singing grounds. For these two routes activity stopped at about the same time. The Rose Lake route is located approximately in the south-central section of the Lower Peninsula. Gratiot-Saginaw is about 40 miles north. Table 14 is a summary showing when the major part of the singing ground activity stopped.

Table 14.--Variations among regions in time woodcock singing ground activity stops

Route	Direction and distance (in miles) from Lansing*	Date when activity no longer observed
Kellogg Bird Sanctuary	SW - 45	May 30
Rose Lake	ENE - 10	June 3
Gratiot-Saginaw	N - 40	June 1
Houghton Lake	N - 105	June 5
Cusino Experiment Station	NNW - 260	June 20

*Located in south-central section of Lower Peninsula.

These data seem to indicate that for 1953 most of the singing ground activity in the southern two-thirds of the Lower Peninsula was completed by the first week of June. But in the Upper Peninsula, where spring arrives later, woodcock activity continued at least two weeks longer.

The earliest date of arrival for Michigan in spring, 1953, is not known. But the first singing ground count made on April 1 showed 16 occupied grounds. This route was run near Houghton Lake.

Additional observations provided data on activity under various weather conditions, variability of hearing distance, and regularity of singing ground occupancy. The writer visited several singing grounds at various stages of the moon and during different weather conditions. In general the full moon seemed to have no effect on the number of active birds or on the length of the first period of evening activity. The birds stopped at approximately the same time regardless of the moon; however, it was observed that often the same singing grounds were occupied later in the night, especially on a full-moon night. Whether or not these grounds were being used by the same bird is not known.

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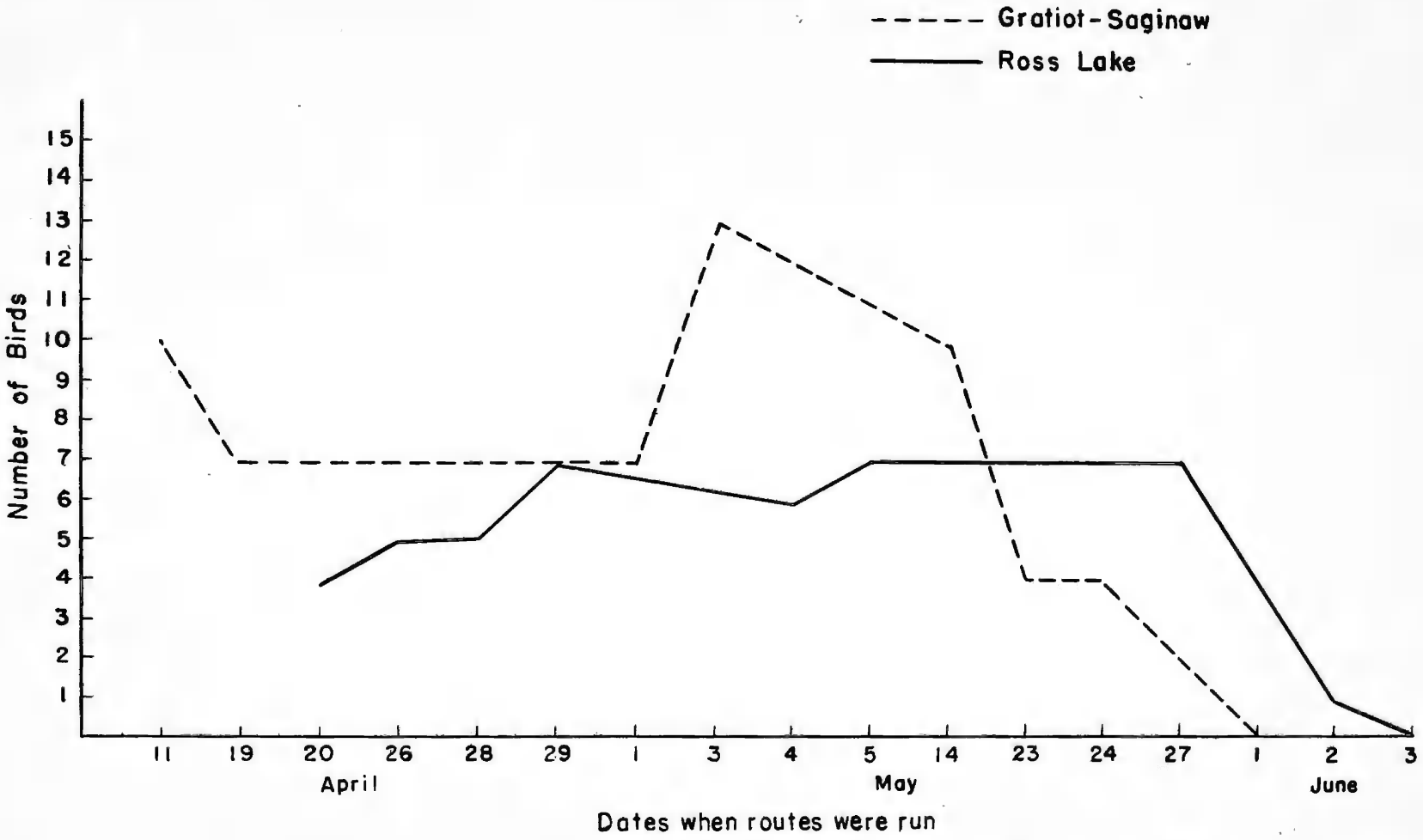

FIG. 2 WOODCOCK SINGING GROUND ROUTES ON SPECIAL STUDY AREAS

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Birds were seen and heard on singing grounds during snow, rain, and heavy winds. On the nights of snow or rain the activity seemed rather normal during the first part of the usual time period, but all activity stopped much earlier than on a clear night. On windy nights the birds seemed as active as ever, but hearing distance of the "peents" was greatly reduced.

Vegetation and topography seem to determine the distance at which peents may be heard. Heavy vegetation and rolling topography often provide a barrier for woodcock sounds. Therefore, there seems to be no possibility of overlap in making counts at 0.4 mile apart. Probably, if it were desirable, the distance could be reduced to 0.3 mile. At least if a complete count of all the birds along a certain route was wanted the distance would probably need to be shortened.

Table 15 illustrates the regularity of singing ground occupancy by male birds. It is noticeable that on the Rose Lake route where the population fluctuation was relatively small during the breeding season most of the grounds were occupied more than 50 percent of the time. On the Gratiot-Saginaw route, where population fluctuations were more pronounced, most of the singing grounds were occupied less than 50 percent of the time. The latter area provides more woodcock cover; therefore, the singing birds may have had a tendency to move more frequently. Singing ground areas and diurnal cover are more restricted along the Rose Lake route.

Table 15.--Regularity of singing-ground occupancy by male birds

Route	Number of birds heard								
	1	2	3	4	5	6	7	8	9
Rose Lake		2		1	2	1		3	
Gratiot-Saginaw	10	3	2	2	3	1			

Most of the woodcock survey data acquired during the period of June 21-September 7 have not been analyzed. However, a part of the data on summer habitat types used by Michigan woodcock has been summarized (table 16). These data show that a high percentage of the birds was flushed from alder or aspen cover or a combination of cover with either or both aspen and alder present. Most of the sites were moist or slightly wet. No woodcock or woodcock sign was observed in the drier upland associations of various vegetative types.

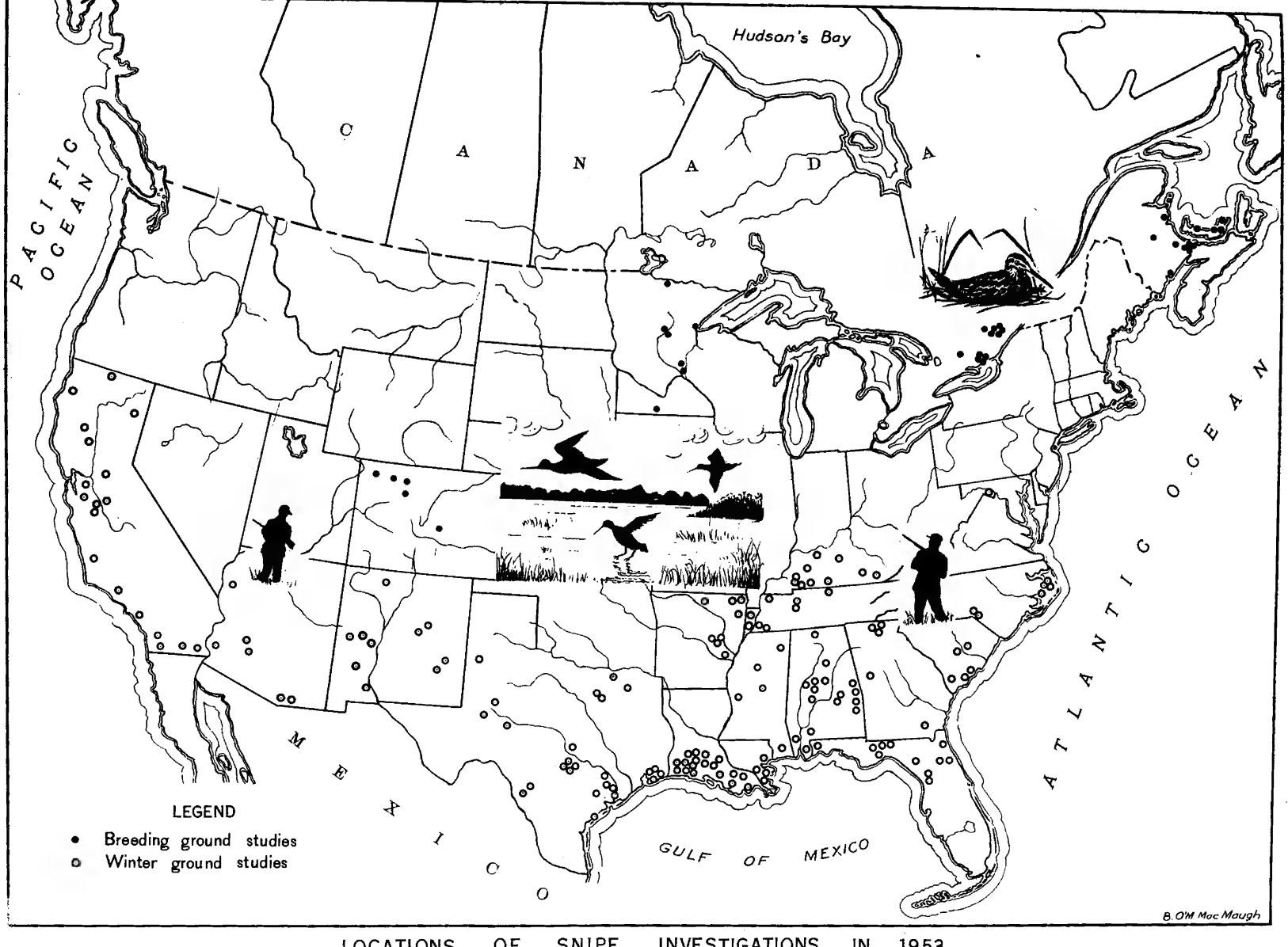
Table 16.--Summer habitat of woodcock in Michigan

Part A. Cover at exact location of flushing

Type	Number of birds flushed
Quaking aspen	6
Quaking aspen - tag alder	5
Quaking aspen - other plants	5
Tag alder	4
Tag alder - other plants	2
Black cherry	1
White cedar - balsam fir	1
Willow - Spirea	1

Part B. Major cover type in general area of flushing

Type	Number of birds flushed
Quaking aspen - tag alder - other plants	13
Quaking aspen - tag alder	9
Popple - white birch	2
White cedar - spruce - balsam fir - white pine	1



LOCATIONS OF SNIPE INVESTIGATIONS IN 1953

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WILSON'S SNIPE WINTERING GROUND STUDIES, 1952-53

Chandler S. Robbins

U. S. Fish and Wildlife Service

These investigations included: (1) Organizing mid-winter snipe counts for the second year in the southern states for the purpose of obtaining an index of abundance; (2) Participating in and summarizing the results of these counts; (3) Trapping and banding snipe in Louisiana, Alabama and Florida; and (4) Summarizing snipe abundance as recorded on the annual Christmas Bird Counts in Audubon Field Notes.

Wilson's Snipe Abundance Index.--Through the cooperation of State game departments, professional and amateur ornithologists and Fish and Wildlife Service personnel, 160 areas in the southern states were covered during the period January 28 to February 1, 1953, for the purpose of obtaining an index to the wintering population in that area. One hundred and eleven areas were worked in both 1952 and 1953. Forty-nine new areas were visited in 1953, and 60 of the 1952 areas were abandoned.

A summary of all reports received is presented in table 17, computations being based on the total number of hours afield (including observations from car and boat as well as birds seen when on foot). The left half of the table gives figures for all areas which were covered in both 1952 and 1953; the right half treats only those areas which were worked in but one of the two years.

In most localities a proportionately large amount of time is spent in traveling from one snipe concentration area to another. For this reason, observers were asked to indicate the exact amount of time spent on foot, as well as the amount spent driving or by boat. Ninety-seven of the 111 reports which covered both years were submitted with sufficient detail on coverage so that the time spent on foot and the number of birds recorded during this time could be separated from the remainder of the observations. These figures, which are listed in the left half of table 18, give the best available indication of changes in abundance between the winters of 1951-52 and 1952-53.

Table 17.--Winter snipe count--2-year comparison based on total time afield

State	Areas covered both years							Areas covered one year only							
	Number of areas	Number of snipe		Hours afield		Snipe per hour		Number of areas		Number of snipe		Hours afield		Snipe per hour	
		1952	1953	1952	1953	1952	1953	1952	1953	1952	1953	1952	1953	1952	1953
Alabama	14	985	430	73h35m	55h58m	13.4	7.7	3	2	9	0	15h40m	16h40m	0.6	0.0
Arizona	2	3	0	5h10m	6h	0.6	0.0	0	4		14		29h25m		0.5
Arkansas	10	328	127	66h02m	66h14m	5.0	1.9	3	0	30		16h30m		1.8	
California	15	142	320	80h19m	91h50m	1.8	3.5	18	3	190	1098*	144h10m	25h30m	1.3	43.0*
Florida	8	275	172	33h50m	36h35m	8.1	4.7	3	3	3	106	12h	27h30m	0.3	3.9
Georgia	1	4	170	8h	8h	0.5	21.2	0	4		6		19h		0.3
Kentucky	1	2	2	9h30m	2h30m	0.2	0.8	0	9		24		48h25m		0.5
Louisiana	17	3823	3376	120h16m	99h37m	31.8	33.9	4	4	571	641	21h14m	13h24m	26.8	47.9
Mississippi	7	2529	41	50h45m	22h35m	49.9	1.8	6	2	125	10	50h15m	9h40m	2.5	1.0
New Mexico	5	20	57	23h55m	23h10m	0.8	2.5	7	5	0	27	41h30m	62h15m	0.0	0.4
North Carolina	4	35	17	36h30m	25h	1.0	0.7		2**		1	6h			0.2
South Carolina	4	257	181	26h30m	19h27m	9.7	9.3	4	1	46	17	19h25m	8h	2.4	2.1
Tennessee	3	0	4	59h	57h	0.0	0.1	0	3		0		9h15m		0.0
Texas	20	390	83	86h50m	107h	4.5	0.8	12	6	91	97	45h20m	36h05m	2.0	2.7
West Virginia	0							0	1		26		9h15m		2.8
Total	111	8793	4980	689h12m	620h56m	12.8	8.1	60	49	1065	2067*	366h04m	319h59m	2.8	6.4*

*Includes a report of 1,000 birds in 8 hours by one observer.

**60 additional areas covered by State Wildlife Resources Committee; 381 snipe recorded, but no record of number of hours afield.

Table 18.--Winter snipe count - 2-year comparison based on coverage by foot only

State	Areas covered both years: Number of areas	Snipe per hour 1952	Snipe per hour 1953	All areas: Additional areas	Snipe per hour 1952	Snipe per hour 1953
California	14	1.6	16.4	18	2.2	12.4
Arizona	1	1.5	0	3	0.8	1.1
New Mexico	5	1.5	4.8	5	0.9	2.4
Texas	16	4.7	1.8	19	4.3	1.9
Total, Region II	22	3.8	2.5	27	3.4	2.0
Percent change, Region II			-34%			-41%
Alabama	14	28.6	17.6	4	26.7	13.0
Arkansas	8	9.5	5.0	4	8.6	3.9
Florida	7	0.5	2.7	7	8.3	4.4
Georgia	0			1		6.
Kentucky	1	0.3	0.8	8	0.3	0.7
Louisiana	17	72.8	76.1	6	65.2	77.0
Mississippi	3	5.0	1.5	6	6.3	1.5
North Carolina	4	0.9	0.8	1	0.9	0.7
South Carolina	4	12.7	11.5	4	7.5	11.1
Tennessee	3	0.0	0.0	2	0.0	0.0
Total, Region IV	61	24.46	23.17	43	21.0	18.5
Percent change, Region IV			-5.3%			-12%
Total	97	19.28	18.74	88	15.2	14.0
Percent change			-2.8%			-7.9%

Statistical analysis of the results of the mid-winter counts is hampered by a large number of variable factors, such as differences between areas, differences between observers, differences between weather conditions (including water levels), etc. The following figures, although preliminary in nature, will show that no appreciable change in population occurred from 1952 to 1953 in the areas sampled. (Further analyses are being conducted in order to determine the number of individual areas required to provide the required degree of accuracy.)

Table 19.--Summary of 1952 and 1953 snipe counts

(using data from coverage on foot only)

	1952	1953
Total areas covered both years	97	97
Total snipe	5,550	4,607
Total hours	269.95	224.17
Total snipe / total hours	20.56	20.55
Percent change		-0.1 %
Mean S/H = $\frac{\text{Snipe per hour}}{\text{Number of areas}}$	21.16	18.36
Standard deviation	4.60	4.28
Percent change		-13.2 %
Total states sampled	13	13
Mean S/H = $\frac{\text{Snipe per hour}}{\text{Number of states}}$	10.74	10.69
Standard deviation	3.28	3.27
Percent change		-0.5 %

Trapping and Banding of Snipe.--Before the winter of 1952-53 only 963 Wilson's snipe had been banded in North America. Of these, 32 were subsequently retrapped or recovered, one of them being recaptured in two different years, and another being reported as retrapped and subsequently shot--making a total of 34 recoveries (3.4%). Of the 32 individuals, 25 were retaken at the locality where banded, 3 were taken at other places in the same state, and 4 were recovered in a different state or province from where banded. Since only 117 Wilson's snipe were reported as banded in North America prior to fiscal year 1940, there has been little opportunity for banded snipe to be recovered through hunting; therefore, recovery percentages on the snipe banded to date would be expected to run very low. The recovery rate for snipe of this same species banded in England (based on over 2,000 birds) is 5 percent.

Japanese mist nets proved effective for trapping snipe for brief periods at dawn and dusk, but they were ineffective during the day (when wind or bright sun made the nets too easily visible) or at night (when snipe tend to fly too high above the ground). The best trapping location tested was along the Mobile Bay Causeway, within a few hundred feet of one of the busiest highways in the country. Due to the advisability of keeping the nets out of public view, they were set up at dusk, and removed by sunrise time. In spite of these limitations, 37 snipe were banded there in three nights. Thirteen others were banded at Sabine National Wildlife Refuge, and 10 at Lake Jessup, Florida (one night). Wing and culmen measurements were recorded for 62 snipe, but due to the large amount of overlap, few individuals could be sexed.

Much more banding will be needed in order to determine migration routes of this species. The four inter-state recoveries on file show movement from Newfoundland to Guadeloupe (French West Indies), Massachusetts to North Carolina, New York to Ontario, and California to British Columbia.

Data from Christmas Season Counts.--Snipe data from the 1952-53 Christmas Bird Counts were examined, and compared with similar counts from previous years. A summary of the number of snipe recorded per 100 party-hours is presented in Table 20, together with similar data for the five previous years. The figures from previous years have been changed slightly from those used in last year's table, as a few of the areas which had been covered in previous years failed to submit reports in 1952-53. All areas which had been covered all six years, and which had reported snipe in one or more of these years, were used in the computations. Data are grouped by Administrative Regions, the same as last year. Comparison of the 1952-53 figures with average of the five previous years (last column of table 20) indicates a substantial increase in Region 5 (possibly a direct result of the very mild autumn in that area). Decreases are shown for the other regions, but in no case are they greater than the normal variability from year to year, which results from the small number of areas covered. No significant change in total population is indicated by these data.

Table 20.--Data from Christmas-season counts

Region		Number of areas	Snipe per 100 party hours						
			1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	5-year average
I	Oreg., Mont., Calif.	9	34	17	7	11	20	8	17.8
II	Utah, Ariz., Okla., Texas	8	35	11	28	28	39	11	28.2
III	Ohio, Ind., Ill., Wis., Minn., Iowa, Mo.	11	1	3	3	4	5	2	3.2
IV	Ky., Tenn., La., Miss., Ala., Va., N.C., S.C., Ga., Fla.	33	9	16	16	21	15	12	17.8
V	Mass., R.I., L.I., Pa., N.J., Del., Md., D.C., W.Va.	18	3	2	8	5	3	27	4.2
	Total U. S.	79	15.1	10.8	11.8	13.7	13.6	14.7	13.0
Change from previous year				-28%	+9%	+16%	-1%	+8%	

WILSON'S SNIPE "WINNOWING" COUNTS IN EASTERN CANADA, 1953

Victor E. F. Solman

Canadian Wildlife Service

Spring counts of winnowing male Wilson's snipe have been made in eastern Canada for several years in connection with somewhat similar studies on woodcock. Sufficient information is not yet available concerning range of individual snipe or time of winnowing to plan such studies for maximum effectiveness. Information gathered in detailed studies in Newfoundland suggests that a part of the post-sunset winnowing period is likely to be most useful as a population index. Individual winnowing snipe in the air may be heard for a distance of at least a half-mile under favorable conditions.

Lacking any other easily determined, more reliable index, counts of winnowing male Wilson's snipe taken annually under comparable conditions, are considered to indicate trends in the snipe population in the areas concerned.

Table 21 furnishes a summary of the 1953 information for comparison with 1952 data, and with average conditions representing a number of years' records for identical areas.

Table 21.--Total winnowing counts for eastern Canada

	1952	1953	Average
Ontario	30	20	37.7
New Brunswick	22	24	21.3
Prince Edward Island	98	79	87.5
Eastern Canada	150	113	146.5

Table 22.--Winnowing male snipe, Canada

Region	Census area	1952	1953	Av.	Number of yrs.	Observer, 1953
			Ontario			
Ottawa	Vars	4	5	4.8	5	R.D.Harris
"	Stittsville	6	6	4.7	5	"
"	Carp	1	0	1.8	5	V.E.F.Solman
"	Hawthorne	9	0	8.0	3	F.H.Schultz & R.deGrosbois
"	Britannia	4	0	2.0	2	R.D.Harris
Kingston	Cataraqui	0	1	4.8	5	G.M.Stirrett
"	Westbrook	0	2	2.0	5	"
"	Perth Rd.	0	2	2.8	5	"
"	Holleford	6	4	6.8	5	"
Totals		30	20	37.7	2-5 yrs.	
			Prince Edward Island			
	Avondale	29	16	11.0	6	A.M.Johnson
	Fortune	22	20	15.4	5	"
	French Village	27	16	13.0	5	"
	Conway	20	27	11.3	6	"
Totals		98	79	87.5	5-6 yrs.	
			New Brunswick			
Moncton	Turtle Creek	0	0	0.3	6	G.F.Boyer
Tabusintac	Price Sett.	2	2	1.3	6	"
Saint John	Tilly Rd.	0	0	0	6	"
Sackville	Rockport Rd.	0	0	0	5	"
	* Aulac-Joli	9	14	10.7	5	"
	* Cookville Rd.	11	8	9.0	5	"
Pineville	Lockstead Rd.	0	0	0	1	"
Totals		22	24	21.3	1-6 yrs.	

* Stops at 0.5-mile intervals.

Table 22.--Winnowing male snipe, Canada--Continued

Region	Census area	1952	1953	Av.	Number of yrs.	Observer, 1953
		Newfoundland *				
	Ship Cove	9			1	L.M.Tuck
	Bay Bulls	30			1	"
	Holyrood	32			1	"
	Salmonier	33			1	"
	Blaketown	34			1	"
	Total	138				

* Since detailed studies concerning time and meteorological conditions associated with winnowing were conducted, no winnowing count data for comparison with 1952 were secured. L. M. Tuck, the investigator, reported however that he has no evidence of a change in snipe population from 1952.

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FURTHER INVESTIGATIONS ON WINNOWING METHOD OF MEASURING WILSON'S SNIPE POPULATIONS

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U. S. Fish and Wildlife Service

Field studies were conducted during the period May 26 to June 16, 1953 in the vicinity of Sackville in southeastern New Brunswick, for the purpose of obtaining additional information on the reliability of the transect method in measuring breeding populations. Three transects were laid out, coinciding in part or in whole with routes that have been used for several years by Wildlife Management Officer George F. Boyer of the Canadian Wildlife Service. Each transect was covered by car, with two-minute stops at each half-mile interval. The number of birds winnowing and the number of winnows heard from each bird were recorded for each minute. It also proved helpful to indicate the direction (in terms of clock hours, with "straight ahead" taken as 12) and approximate distance (near, medium and far) of each winnowing bird; in this way, any significant change in position during the two-minute period could be detected, and nearly all duplication with birds at the preceding and following stop could be recorded as such. Temperature, wind and sky condition were recorded at the beginning and end of each transect, and notations of significant weather changes during the transects were also recorded. I wish to thank Dr. V. E. F. Solman, Chief Biologist, Canadian Wildlife Service, for suggestions in connection with these studies; and I am most especially grateful to Mr. Boyer for helping with the selection of study areas, for accompanying me on several transects and nest hunts, and for numerous other courtesies during the investigations.

Areas Studied

For purposes of future identification, the locations of the transects and other study areas are given in detail. All localities except Cookville may be found on Amherst (Nova Scotia-New Brunswick) quadrangle of the National Topographic Series, Canada Department of Mines and Resources.

Jolicure-Aulac transect: Start at road intersection 1-1/4 miles southwest of Jolicure, Westmorland Co., N. B.; southwest 1-1/4 miles; east 3/4 mile; south along west edge of Fort Cumberland Ridge until 0.2 mile north of Highway No. 2 west of Aulac. Total, 5-1/2 miles, 12 stops.

Cookville transect: Start 1/4 mile southwest of Cookville; turn southeast at Cookville and proceed toward Midgic Station. Total, 3 miles, 7 stops.

Midgic transect: Start at road intersection 1-1/4 miles south-southwest of Midgic Station; east at Upper Sackville post office; stop one mile west of Chignecto Dry Dock. Total, 7 miles, 15 stops.

Midgic study area: Two miles northeast of Upper Sackville at Canadian National Railway crossing (= stop number 3 on Midgic transect).

Jolicure study area: Northeast corner of Front Lake Marsh, 3/4 mile by road northwest of Jolicure (not on any transect).

The transects were normally covered from north to south.

Comparisons with Manitoulin Island Conditions

Investigations in the Sackville area of New Brunswick confirmed the conclusions of the 1952 studies on Manitoulin Island, Ontario. Winnowing was consistent enough to serve as a population index only during a period of about half an hour in the evening and half an hour in the early morning.

The Manitoulin and the Sackville areas have exactly the same latitude. One of the Sackville routes actually cut across the latitude where the Manitoulin studies were made (45° 54'), and the other two routes were within ten miles of the same latitude. Therefore, in comparing the two areas no correction need be made for geographical position with respect to sun position, as long as time intervals are computed from local sunrise and sunset time. The difference in elevation of 580 feet is not considered to have any more significant effect than the local differences in weather conditions.

The fact that both Manitoulin Island and Sackville areas are encompassed within the same life zone, having a pine-hemlock-northern hardwood climax, would seem to indicate a similarity of climatic factors important to life processes. However, there may be some differences which conceivably could effect the behavior of snipe such as an average greater amount of fog in the maritime Sackville area which should be taken into consideration.

Time of Day

Table 23 shows a comparison between the times of starting and stopping of the periods of peak winnowing in the evening and in the morning, for both the Ontario and the New Brunswick areas. Observations made under rainy, windy or other particularly unfavorable conditions have been omitted from the table. There is still considerable variation from day to day as shown by the standard deviations, but no significant difference in winnowing time between the two areas is indicated. Therefore, the times of peak winnowing indicated here may

be assumed to be applicable to other areas with the same latitude assuming that there are no great climatic differences which could effect the disturbing weather factors mentioned beyond. Also with suitable corrections, these may be applied to localities farther north or farther south, where the twilight period is of different length. The optimum period in the morning, in the vicinity of 46° N. Lat., is from 75 to 40 minutes before local sunrise; and in the evening from 30 to 60 minutes after sunset.

Table 23.--Time of day of winnowing peak (in minutes after sunset or before sunrise)

	Beginning of winnowing peak					End of winnowing peak					
	Earliest	Latest	Mean	6	Number of days	Earliest	Latest	Mean	6	Number of days	Length
Evening											
Manitoulin Island	26	45	35	7.8	3	62	76	70	5.8	4	35
Sackville, N.B.	18	35	28	4.7	8	44	68	56	7.4	11	28
Morning											
Manitoulin Island	82	69	73	5.1	4	47	33	38	4.8	5	35
Sackville, N.B.	88	67	76	8.0	12	54	32	43	6.9	15	33

Effects of Weather.--In order to evaluate the effects of various weather conditions on winnowing activity, the results of each winnowing count were plotted against wind speed, temperature and sky condition. Since the three routes were of different length and each had a different snipe population, the total number of snipe recorded in the first minute of each 2-minute stop was plotted as a percentage of the average total for first-minute stops for that particular route. Similarly, totals from the second-minute counts were plotted as percentage of the average for all second-minute stops for that same route. This gave a total of 20 morning samples and 20 evening samples.

Wind.--Wind speeds of 5 miles an hour or more invariably reduced winnowing activity below normal. Increases to 10 m.p.h. generally stopped all winnowing. This was by far the most important single factor influencing winnowing.

Temperature.--Half of the morning counts were taken when the temperature at starting time was between 30° and 40° F. The other half were made with temperatures between 40° and 55°. All of the cool mornings produced results above the average; on all of the warmer mornings, results were near or below average. On the two days when the early morning temperature was above 50°, the counts were especially low (45 to 75 percent of average); on one of these days a wind of 5 to 10 m.p.h. and light rain may well have been the primary factors in the low count rather than the temperature, but on the other day there was no precipitation and the wind was calm.

No correlation was found between evening temperatures and snipe winnowing activity.

Sky Condition.--Clear skies in the early morning were associated with average amount of winnowing (within 20 percent), with tendency to be above average rather than below. Clear skies in the evening were associated with much more variable results (from 40 percent below average to 40 percent above average). There were only two nights with the sky about half covered with clouds, and on one of these the wind speed was 5 m.p.h. and there was very little winnowing; on the other night results were close to normal. On calm, overcast evenings and mornings winnowing was very variable, ranging from 45 percent above normal to 55 percent below. Rain gave definitely inferior results; but early morning fog, on the two days when it occurred, was associated with near average winnowing on one date, and with the very highest amount (60 to 80 percent above normal) on the other.

Gustiness.--Correlation of winnowing activity with the observed variables of wind, temperature and sky condition suggest that another factor, closely connected with these three, may actually be the most

important one. It is an established fact that wind gustiness is very greatly reduced under certain conditions--especially when low level temperatures inversions at night eliminate the two types of turbulence--that due to rising convection currents and that due to mechanical friction with irregularities on the earth's surface. Temperature inversions frequently occur soon after sunset and persist until after sunrise; they occur most frequently when a clear sky and little or no wind permit rapid cooling of the earth's surface through radiation. After the surface temperature has dropped to or below the temperature of the air immediately above it, convection currents must cease. The inversion may build up to several hundred feet above the earth's surface. Although the existence of an inversion frequently cannot be detected by an observer on the ground, studies conducted at Brookhaven National Laboratory on Long Island 1/ have shown the conditions under which they are likely to occur. If we consider only those mornings when the wind was 4 m.p.h. or less, the sky clear (or with fog) and the temperature low (under 40° F.) we find that in every case the amount of winnowing was above the average. With similar evening conditions, but with temperature under 50°, seven out of eight observations (4 different evenings) were normal or above, and the eighth one was only 18 percent below the average.

Altogether there were 5 evenings and 5 mornings with winnowing at or above average. Four of these mornings and 3 of the evenings are discussed in the preceding paragraph. The other three cases may also have been under inversion conditions, as the wind was 1 to 2 miles an hour, the temperature within (or within one degree of) the above arbitrary limits, and the sky from 50 to 100 percent overcast. While inversions are most frequent under clear skies, they occur to a lesser extent under partly cloudy and cloudy conditions.

In some instances snipe have been observed winnowing under very turbulent conditions, as upon the approach of a thunder shower; so turbulence, while it may limit the amount of winnowing, will not always stop it entirely. Winnowing is frequently but irregularly noted during the daytime and is more prevalent during calm, cloudy weather than otherwise. This also suggests a correlation between stability of the air and amount of winnowing. Further investigations will be required to test the importance of gustiness as related to winnowing, but present indications suggest the advisability of conducting winnowing counts under inversion or isothermal conditions.

1/ Singer, Irving A., and Maynard E. Smith. Relation of gustiness to other meteorological parameters. Journal of Meteorology 10 (2): 121-126, Apr. 1953.

WILSON'S SNIPE AND SORA RAIL IN YAMPA RIVER VALLEY, COLORADO

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During the spring and summer of 1953, breeding populations of Wilson's snipe (Capella gallinago) and sora rail (Porzana carolina) in the Yampa River Valley, Colorado, were censused by the writer in conjunction with a waterfowl production study.

The Yampa Valley is a long narrow floodplain and canyon extending from headwaters on the White River Plateau to its confluence with the Green River in northwest Colorado. The valley varies from one-fourth mile in width in the canyons to about 10 miles in width shortly after its emergence onto the floodplain proper just southeast of Steamboat Springs. The water table along the entire non-canyon portion of the valley is high, and development of sedge and cattail marsh is extensive. This habitat, plus the oxbow and meandering stream areas, constitutes the waterfowl, snipe, and rail breeding grounds found in the region. The principal snipe and rail breeding grounds are situated at altitudes varying from 6,000 to 8,000 feet.

Wilson's snipe were most frequently seen around flooded meadows, bogs, and willow swamps, apparently preferring the boglike areas containing dense growths of sedge (Carex spp.). Sora rails were invariably found in the vicinity of small marsh areas vegetated with cattails (Typha) and bulrushes (Scirpus).

Table 24.--Territorial snipe and rails observed on study areas, Yampa River Valley, Colorado, 1953

Area	Approximate elevation	Snipe		Rail	Total
		Breeding territories	Winnowing areas	breeding territories	
Stillwaters	9,500	-	-	-	-
Phippsburg	7,800	13	8	5	26
Steamboat Springs	6,800	10	6	1	17
Tow Creek	6,600	-	-	-	-
Carey Ranch	6,400	8	4	5	17
Big Bottoms	6,100	-	-	-	-
Duffey Mountain	5,800	-	-	-	-
Juniper Springs	5,700	-	-	1	1
Maybell	5,600	1	2	-	3
Lily Park	5,400	-	-	-	-
Total		32	20	12	64

Snipe were first observed in the valley during mid-April, but the greatest influx of birds was recorded during the first week of May. The first rail was seen on May 18, with the peak flight occurring early in June.

Winnowing flights of snipe were observed during May, June, and July, the peak of activity being in June. Those winnowing flights during the early mornings were recorded in conjunction with waterfowl brood-counts. Territorial snipe and rails listed in Table 24 were flushed as the observer walked through the study areas in search of waterfowl. Snipe or rails seen repeatedly in particular locations were recorded as territorial birds.

A snipe nest was found on June 5, and considerable numbers of young birds were seen during the breeding season. In August and early September snipe from individual breeding areas assembled in flocks of 20 to 60 birds in preparation for the fall migration.

A breeding population of 20 snipe and 12 rails (Table 24) were observed on the 10 study areas which constituted a randomized 10 percent sample of the Yampa River Valley. Projection of these figures indicates a total breeding population of 200 snipe and 120 rails in the valley.